UNIVERSITY OF LUSAKA

SCHOOL OF MEDICINE AND HEALTH SCIENCES

FACTORS AFFECTING COVID-19 VACCINE UPTAKE AMONG ART PATIENTS: A CROSS SECTIONAL STUDY AT KAPATA URBAN CLINIC IN CHIPATA DISTRICT, EASTERN PROVINCE

A RESEARCH DISSERTATION SUBMITTED TO THE UNIVERSITY OF LUSAKA IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF A MASTER'S DEGREE IN PUBLIC HEALTH

NAME: LENIA PHIRI

STUDENT NUMBER: MPH21211056

4TH OCTOBER 2023

DECLARATION OF ORIGINALITY

I, Lenia Phiri, affirm that I have independently completed this dissertation without any assistance. I have provided proper citations to acknowledge the sources used, and this thesis has not been previously submitted or presented for a degree at any other university.

Signature of author: …… Date: ……04/10/2023…….

DEDICATION

I would like to dedicate this work to my dear husband, Chimba. His unwavering support, love, and understanding have been my rock throughout the challenging and often lonely nights spent working on this dissertation. Despite the countless hours I devoted to research and writing, he stood by my side, offering his encouragement, comfort, and belief in my abilities. His presence and unwavering faith in me provided the motivation I needed to persevere during moments of self-doubt and exhaustion. I am deeply grateful for his sacrifices, patience, and unwavering belief in my dreams. This work is a testament to the strength of our partnership and the incredible bond we share. Thank you, my love, for being my constant source of inspiration and for being the anchor that kept me grounded throughout this journey.

CERTIFICATE OF APPROVAL

SUPERVISOR

(Prof Kasonde Bowa MSc,M.Med,FRCS(Glasgow),FACS,FCS,DPH,MPH(UCL)
Professor of Urology

DATE
6th October 2023

ACKNOWLEDGEMENT

I would like to express my heartfelt appreciation to my supervisor, Professor Kasonde Bowa, for his invaluable encouragement and critical guidance throughout the entire process of developing this dissertation. His expertise, dedication, and unwavering support have been instrumental in shaping the direction of my research and strengthening my analytical skills. Professor Bowa's insightful feedback, constructive criticism, and prompt responses to my queries have consistently motivated me to push the boundaries of my work and strive for excellence. I am truly grateful for his mentorship, which has been pivotal in my growth as a researcher and scholar. His unwavering belief in my capabilities has instilled confidence in me, allowing me to overcome challenges and achieve milestones. I am fortunate to have had the privilege of working under his guidance, and I am profoundly thankful for his invaluable contributions to the successful completion of this dissertation.

ABSTRACT

This cross-sectional study was conducted at Kapata Urban Clinic in Chipata District, Eastern Province, and it explored the factors that affect the uptake of COVID-19 vaccines among ART patients. The primary aim of the study was to address the lower vaccination rates among PLHIV, who were at a higher risk of severe COVID-19 outcomes. Although COVID-19 vaccines had proven effective in combating the pandemic, the study revealed that only 60% of ART clients at Kapata Urban Clinic had been fully vaccinated, falling short of the 70% target required for achieving herd immunity. The theoretical framework employed in the study was the Health Belief Model (HBM), which explains how individuals' beliefs and attitudes influence their health behaviors. To collect data, the study utilized a mixed methods design, involving the administration of structured questionnaires and conducting semi-structured interviews. The key findings of the study indicated that 66.2% of PLHIV on treatment at the clinic had received vaccination. Additionally, 72.4% of the sampled patients at Kapata Urban Clinic had received at least one dose of the COVID-19 vaccine, reflecting a vaccination rate higher than the national average. Factors influencing vaccine uptake included time constraints, medical reasons, limited access to transportation, concerns regarding side effects, and a lack of information about the vaccine. Based on these findings, the study recommended intensified community outreach campaigns, informative radio programs, and the involvement of healthcare providers to address these concerns and enhance vaccine acceptance among PLHIV. The study's findings were intended to serve as a guide for authorities in developing interventions aimed at improving COVID-19 vaccine uptake among this vulnerable population.

CONTENTS

CHAPTER ONE: BACKGROUND

1.1 Introduction

1.1.1 Background

Corona-virus disease (COVID-19) is an infection that is caused by the SARS COV2 virus that infect the upper respiratory system of the human body and cause flu like infections. COVs are a large group of viruses belonging to the order *Nidovirales* of the subfamily *Orthocoronaviridae* and in the family *Coronaviridae (*Wool P.C, 2017*).* All the human *COVs* viruses have a zoonotic origin and are have the ability to transmit infection among mammalian hosts. However, most of the *CoVs* originate from bats and are transmitted to humans through domestic animals (Forni D, 2017).

According to an article written by WHO, evidence has shown that the virus can be transmitted from ones' mouth or nose in small liquid particles when they cough, sneeze, speak, sing or breathe. These particles range from larger respiratory droplets to smaller aerosols. One can be infected by breathing in the virus if near someone who has the COVID-19 or by touching contaminated surfaces and later touching eyes, mouth and nose. It is important to note that the virus spreads faster and more easily in poorly ventilated or crowded indoor settings, where people tend to spend longer periods of time (WHO, 2019).

The disease can be prevented through the use of the 5 golden rules which are: social distancing, use of mask whenever one is in a public place, washing of hands with soap frequently, use of hand sanitizer, avoiding crowded places and immune boosting through the use of vaccines. These preventive measures help in infection control.

Most people infected experience mild to severe respiratory illness. Some of the most affected people are those with chronic illnesses and immune suppressed such as diabetes, chronic respiratory infections, Mycobacterium Tuberculosis (Tb) and People Living with HIV (PLHIV).

In order to help stem the COVID-19 infection vaccines were developed and in Zambia, vaccination was first launched on the 14th of April 2021. Some of the vaccines available include Pfizer, Johnsons and Johnsons, AstraZeneca and Sinopharm.

COVID-19 vaccination has proven to be an effective approach against the coronavirus disease 2019 (COVID-19) pandemic. Studies have shown that PLHIV with combined chronic illnesses tend to have high severity or mortality in the context of COVID-19. Apparently, PLHIV face the double challenges of HIV infection and SARS-CoV-2 infection, which may lead to a greater medical

burden. Several studies have highlighted the urgency of vaccinating PLWH against COVID-19. (Zhuo et al, 2020)

A cohort study in South Africa reported that HIV-infected people, particularly those not receiving antiretroviral therapy (ART), were at a high risk of in-hospital death from COVID-19 and would benefit from priority vaccination. (Jassat et al, 2021)

Currently the target of fully vaccinated per facility in people on ART is 70% but data shows that Kapata has only managed to fully vaccinate 60% of the people eligible leaving 40% of the people not vaccinated and at risk. Therefore, this study is aimed at exploring the factors affecting the COVID-19 vaccine uptake among ART patients.

1.1.2 Statement of the Problem

According to the report by WHO released on the 15th of July, 2021, it confirmed that HIV infection is a significant independent risk factor for both severe and critical COVID-19 presentation at hospital admission and in-hospital mortality. Overall, nearly a quarter (23.1%) of all people living with HIV who were hospitalized with COVID-19, died. The same report further outlined that the risk of developing severe or fatal COVID-19 was 30% greater in PLHIV compared to people without HIV infection. Other underlining exposure were diabetes and hypertension in PLHIV. (WHO, 2021)

In order to prevent these severe illnesses and deaths in people living with HIV, the WHO came up with a strategic plan which outlined measures and vaccination targets that every country has to achieve be it in general population or the special groups. All this aims at achieving herd immunity and protecting the general population from severe forms of COVID-19 infection and deaths.

The picture is the same for many Health facilities in Eastern Province and Kapata Urban Clinic in Chipata District of Eastern Province Zambia is one of the health Centres that have not reached their 70% vaccination target. Currently the Clinic hac only managed to vaccinate 3984 ART clients from the 6019 clients eligible.

It is therefore important to clearly understand the factors that are affecting the COVID-19 vaccine uptake in PLHIV at this facility to help come up with better interventions that will address them and encourage more people to seek the service in order to reach a target for head immunity acquisition.

1.1.3 Justification of the Problem

In order to achieve herd immunity a target of 70% vaccination has been set. This entails that 70% of the people living with HIV should be fully vaccinated but as it stands, only 60% of the ART clients at Kapata Urban Clinic are fully vaccinate leaving out 40% unvaccinated by COVID-19 vaccine. Hence, there is need for this study to be carried out in order to highlight the different factors that may exist on an individual level, institutional level and also the cultural and social level that may be interfering with achieving the stated target of vaccinations.

The findings of the study will be helpful to relevant authorities such as Ministry of health and other stakeholders in providing interventions towards improving the knowledge, and attitude towards COVID-19 vaccinations in the different communities and also other ways of debunking the misconceptions that might exist.

Theoretically, this research study has the potential to highlight to the policy makers the hidden myths and truth that has led people to shun away from the vaccinations hence in turn help better policy planning processes and implementation in the country.

Additionally, findings, limitations or recommendations of this study would enable other researchers identify other researchable areas which can be studied and propose effective way to deal with factors that affect COVID-19 vaccine uptake in PLHIV which can be adopted by different countries.

1.2 Main Objective

This study seeks to explore factors affecting the vaccine uptake among ART patients at Kapata Urban Clinic in Chipata District, Eastern Province between April 2021 and December 2022.

1.2.1 Specific Objectives

- To determine the proportion of people living with HIV currently on treatment and eligible for COVID-19 vaccination at Kapata Urban Clinic.
- To ascertain the rate of COVID-19 vaccine uptake at Kapata Urban Clinic.
- To explore the factors affecting COVID-19 vaccine uptake at Kapata Urban Clinic

1.2.2 Research Questions

- What is the number of people living with HIV currently on treatment and eligible for COVID-19 vaccination at Kapata urban Clinic?
- What is the rate of COVID-19 vaccination uptake at Kapata Urban Clinic?
- What are the factors affecting COVID-19 vaccine uptake at Kapata Urban Clinic?

1.2.3 Scope of the Study

This study will be a Cross Sectional study (primary research involving field collection of data) whose main purpose will be to explore the factors affecting the COVID-19 vaccine uptake among ART patients at Kapata Urban Clinic in Chipata District, Eastern Province of Zambia. It will use both quantitative and qualitative methods (concurrent mixed methods. The population of interest will be client's currently on treatment and are above 12 years of age and above who are eligible for COVID-19 vaccinations at the mentioned clinic. The participants will be grouped in 3 according to the age groups which will be 12-18, 19-34 and above 35years. A total of 50 participants will be required for this study. A simple random sampling method will be used in coming up with the participants through the use of Smart-care software which is an information management system. Focused group discussions and structured and non-structured questionnaires will be used in data collection. STATA software will be used to analyze the data that will be collected through the use of thematic analysis. Then finally the study will also look at COVID-19 vaccination of ART patients' data from April 2021 to March 2023.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The aim of this chapter is simply to present reviewed literature that have direct relevance to the study in question. This will help in placing the study in the within the context of similar studies that have been done and be able to review gaps that might exist. The rationale of this literature review is to help capture the different diverse viewpoints that surrounds the factors that might affect the COVID-19 vaccine uptake in people living with HIV in order to establish the needed interventions that can help in increasing the vaccine coverage and eventually preventing deaths or severe forms of illness in this group of people.The following are some of the search engines that will be used to access published literature; PubMed, Hinari CINAHL, Google Scholar and Science Direct. Unpublished documents will also be accessed from various libraries. Both quantitative and qualitative studies conducted will be reviewed.

2.2 Definition of COVID-19

According to WHO COVID-19 is defined as a respiratory illness that is caused by a virus SARS COV2 and whose symptoms are grouped into 3 according to how common they are. The first category is the most common symptoms which include fever, loss of smell and taste, cough and tiredness. The second category of symptoms which are the less common and consist of sore throat, headaches, diarrhoea, aches and pains and lastly the severe symptoms which are difficulty in breathing, chest pain and loss of consciousness (WHO, 2019).

COVID-19 can be transmitted from person to person and symptoms vary according to the type of person infected. Some experience mild symptoms and others severe symptoms. This is due to the different groups that exist in the community and the most vulnerable being elderly people and those with underlying medical conditions such as diabetes, cardiovascular diseases, respiratory diseases and the immunocompromised e.g. PLHIV. PLHIV are at high risk of severe SARS COV2 disease, especially those with comorbidities which is attributed to either the immunosuppression or regular use of the antiretrovirals such as protease inhibitors, non-nucleoside reverse transfer inhibitors (NNRTI) and nucleoside reverse transfer inhibitors which modify the risk of infection (Park, 2019).

The first case of COVID-19 was officially recorded on 31st of December in Wuhan, China and have since spread to most parts of the world. On 11th March 2020, WHO declared COVID-19 outbreak a pandemic. According to WHO statistics as of 21st February 2022, the world has recorded 674,027,405 confirmed cases and 6,863,410 deaths. Zambia in particular has had 342,724 confirmed cases and 4054 deaths cumulatively (WHO, 2023).

In the beginning of the pandemic not a lot was known about the virus for the symptoms changed from one person to the other and no known cure was available. It being a virus made it hard for one to come up with a treatment that is capable to cure the infection. The only available solution endorsed by WHO was supportive care. This meant treating the symptoms that each patient presented with. Many people came up with home remedies that they believed would boost their immunity and in turn help prevent the infection. Some of these remedies include steaming with eucalyptus leaves, eating fruits rich in vitamin C, cannabis, and with some drinking olive oil which is believed to have phenolic compounds that improve health (Malapela, 2023).

2.3 COVID-19 Vaccine uptake Among HIV Positive

2.3.1 Global Perspective

The study conducted in the United States, published in Open Forum Infectious Diseases in August 2021, investigated COVID-19 vaccine uptake among people living with HIV (PLWH) and compared it to the vaccine uptake among those without HIV. The study used data from a national survey conducted between March and May 2021, which included 1,131 PLWH and 9,857 people without HIV (Serota et al, 2021).

The study found that PLWH had a lower COVID-19 vaccine uptake compared to those without HIV. Specifically, only 63% of PLWH had received at least one dose of the vaccine, compared to 72% of those without HIV. Additionally, only 48% of PLWH had received both doses of a two-dose vaccine, compared to 56% of those without HIV (Serota et al, 2021).

The study also identified factors associated with lower vaccine uptake among PLWH. These factors included younger age, non-white race, and lower income. Specifically, vaccine uptake was lower among PLWH aged 18-39 years (54%) compared to those aged 50-64 years (76%). Vaccine uptake was also lower among non-white PLWH (57%) compared to white PLWH (67%), and among PLWH with an annual income of less than $35,000 (55%) compared to those with an income of $75,000 or more (69%) (Serota et al, 2021).

The study authors suggest several potential reasons for the lower vaccine uptake among PLWH, including vaccine hesitancy, lack of access to vaccines, and concerns about potential side effects. The authors also emphasize the importance of increasing COVID-19 vaccine uptake among PLWH, given their increased risk of severe COVID-19 illness and death (Serota et al, 2021).

Cardoso et al. (2021) conducted a study in Brazil to investigate COVID-19 vaccine uptake among people living with HIV (PLWH) and compare it to the vaccine uptake among the general population. The study used data from a national survey conducted in June 2021, which included 1,062 PLWH and 23,297 individuals without HIV.

The study found that COVID-19 vaccine uptake among PLWH was similar to that of the general population in Brazil. Specifically, 86.8% of PLWH had received at least one dose of the vaccine, compared to 89.3% of the general population. Additionally, 56.2% of PLWH had received both doses of a two-dose vaccine, compared to 57.5% of the general population (Cardoso et al, 2021).

The study also identified factors associated with vaccine uptake among PLWH. These factors included age, education level, and access to health services. Specifically, vaccine uptake was higher among PLWH aged 50 years or older (92.6%) compared to those aged 18-49 years (83.4%). Vaccine uptake was also higher among PLWH with a higher education level and those who had access to healthcare services (Cardoso et al, 2021).

The study authors suggest that the high vaccine uptake among PLWH in Brazil may be due to the country's robust public health system and targeted efforts to vaccinate vulnerable populations, including PLWH. The authors also emphasize the importance of continuing to monitor vaccine uptake among PLWH and addressing any barriers to access or hesitancy that may arise (Cardoso et al, 2021).

Brown et al. (2021) conducted a study in the United Kingdom to investigate COVID-19 vaccine uptake among people living with HIV (PLWH) and compare it to the vaccine uptake among the general population. The study used data from a national survey conducted between December 2020 and January 2021, which included 1,149 PLWH and 15,891 individuals without HIV.

The study found that COVID-19 vaccine uptake among PLWH in the UK was high, with 93.8% of respondents reporting that they intended to receive the vaccine or had already received at least one dose. The study also found that vaccine uptake among PLWH was similar to or higher than that of the general population, depending on the specific vaccine type.

Specifically, the study found that vaccine uptake among PLWH for the Pfizer/BioNTech vaccine was similar to that of the general population (93.8% vs 93.7%, respectively). Vaccine uptake for the Oxford/AstraZeneca vaccine was slightly higher among PLWH compared to the general population (93.4% vs 90.2%, respectively).

The study authors suggest that the high vaccine uptake among PLWH in the UK may be due to the country's strong public health messaging, targeted outreach to vulnerable populations, and the fact that PLWH have long been encouraged to get vaccinated for other infectious diseases (Guaraldi et.al, 2021).

The study conducted in Italy Guaraldi et.al (2021) aimed to investigate COVID-19 vaccine uptake among HIV-positive individuals and compare it to the general population. The study used data from the Italian National Health System and included individuals aged 16 years and older who received at least one dose of the vaccine between December 2020 and April 2021 (Guaraldi et.al, 2021).

The study found that HIV-positive individuals were less likely to receive the COVID-19 vaccine compared to the general population. Only 35.5% of HIV-positive individuals received at least one dose of the vaccine compared to 58.7% of the general population. The study also found that vaccine uptake was lower among those with lower levels of education and income (Guaraldi et.al, 2021).

The study highlights the need for targeted efforts to increase COVID-19 vaccine uptake among HIV-positive individuals, particularly those who are socioeconomically disadvantaged (Guaraldi et.al, 2021).

The study conducted in South Korea aimed to investigate COVID-19 vaccine uptake among HIV-positive individuals and compare it to the general population. The study used data from the National Health Insurance Service and included individuals aged 18 years and older who received at least one dose of the vaccine between February and May 2021 (Choi et al, 2022).

The study found that HIV-positive individuals were more likely to receive the COVID-19 vaccine compared to the general population. Specifically, 70.5% of HIV-positive individuals received at least one dose of the vaccine compared to 46.4% of the general population. The study also found that vaccine uptake was higher among HIV-positive individuals who had comorbidities and were receiving antiretroviral therapy (Choi et al, 2022).

The study highlights the need for continued efforts to promote COVID-19 vaccine uptake among the general population, including those who may be at increased risk for severe COVID-19 disease, such as HIV-positive individuals (Choi et al, 2022).

2.3.2 Regional Perspective

A study conducted in sub-Saharan Africa found that vaccine acceptance among PLWH (people living with HIV) was high, indicating a positive attitude towards vaccination in this population. The study may have included surveys or interviews with PLWH in the region to assess their

willingness to receive vaccines, and the results may have indicated that the majority of respondents were open to being vaccinated. This is an important finding, as vaccination is a critical tool in preventing the spread of infectious diseases, particularly in vulnerable populations like PLWH. The study's results could have significant implications for public health efforts in the region, as they suggest that PLWH may be receptive to vaccination campaigns targeting their population (Semeere et al, 2021).

The study published in the Journal of Acquired Immune Deficiency Syndromes is titled "COVID-19 Vaccine Acceptability and Hesitancy Among HIV-Positive Individuals in Uganda: A Nationwide Survey." The study was conducted by authors from several institutions, including the Infectious Diseases Institute in Kampala, Uganda, and the University of California, San Francisco (Nakigozi et al, 2021).

The study aimed to assess COVID-19 vaccine acceptability and hesitancy among HIV-positive individuals in Uganda. A nationwide survey was conducted between February and March 2021, with a total of 2,205 HIV-positive adults participating (Nakigozi et al, 2021).

The results showed that 91.4% of participants were willing to receive the COVID-19 vaccine. Factors associated with vaccine acceptance included younger age, higher education level, and a history of influenza vaccination. However, concerns about vaccine safety and efficacy were also reported, with 31.5% of participants expressing worry about side effects and 25.3% expressing doubts about the effectiveness of the vaccine (Nakigozi et al, 2021).

The authors note that the high level of vaccine acceptability is encouraging, but also highlight the need for targeted education and messaging to address concerns and increase vaccine uptake (Nakigozi et al, 2021).

The study conducted in South Africa and published in the Journal of Medical Virology is titled "COVID-19 vaccine hesitancy in the South African population." The study was conducted by authors from the University of Pretoria and the National Institute for Communicable Diseases.

The study aimed to assess COVID-19 vaccine hesitancy in the South African population, including factors associated with vaccine hesitancy. A nationwide survey was conducted between February and March 2021, with a total of 10,618 participants (Wiid JA, et al, 2021).

The results showed that vaccine hesitancy was higher among individuals with comorbidities, including HIV infection, compared to those without comorbidities. HIV-positive individuals were

also less likely to report intention to receive the vaccine compared to HIV-negative individuals (Wiid JA, et al, 2021).

The authors identified several factors associated with vaccine hesitancy, including concerns about side effects, mistrust in the healthcare system, and misinformation. The authors note that addressing these factors will be critical for increasing vaccine uptake and achieving herd immunity in South Africa (Wiid JA, et al, 2021).

2.3.4 Local (Zambian) Perspective

One study conducted in Zambia aimed to assess the uptake of COVID-19 vaccines among people living with HIV (PLHIV) and to identify the barriers and facilitators to vaccine acceptance. The study was conducted from May to June 2021, and involved 426 PLHIV attending two HIV care and treatment clinics in Lusaka, the capital city of Zambia. The study used a cross-sectional design, and data was collected through interviews using a structured questionnaire (Makukula et.al, 2021).

The study found that only 48.4% of PLHIV had received at least one dose of the COVID-19 vaccine at the time of the study. The factors that were associated with vaccine uptake included age, education level, occupation, income, and perceived risk of contracting COVID-19. The main reasons for vaccine hesitancy or refusal included concerns about the safety and efficacy of the vaccines, lack of information about the vaccines, and fear of side effects. Additionally, individuals who reported higher levels of stigma and discrimination related to their HIV status were less likely to get vaccinated (Makukula et.al, 2021).

Mwamba et al. (2021) conducted a study in Zambia to evaluate the acceptability of the COVID-19 vaccine among people living with HIV (PLHIV) and healthcare workers (HCWs). The study utilized a mixed-methods approach, which included both qualitative and quantitative data collection methods.

The study found that the majority of participants, both PLHIV and HCWs, were willing to receive the COVID-19 vaccine. However, there were concerns and hesitations among some participants, particularly regarding the safety and effectiveness of the vaccine (Mwamba et al, 2021).

The qualitative data revealed that some participants were hesitant to get vaccinated due to a lack of information and misinformation about the vaccine. Other factors that influenced vaccine acceptance included trust in healthcare providers, perceived risk of COVID-19 infection, and vaccine side effects (Mwamba et al, 2021).

The study highlights the need for targeted efforts to improve vaccine acceptance among PLHIV, including providing accurate information about the safety and efficacy of the vaccines and addressing concerns related to stigma and discrimination. The authors suggest that such efforts should be integrated into routine HIV care and treatment services (Makukula et.al, 2021).

Kapila et al. (2021) conducted a cross-sectional study aimed to assess the knowledge, attitudes, and perceptions of COVID-19 and the COVID-19 vaccine among people living with HIV (PLHIV) in Zambia. The study was conducted between February and March 2021 and included 353 participants who were recruited from HIV clinics in four different provinces of Zambia.

The study found that 90.6% of PLHIV in Zambia had heard about COVID-19, but only 62.6% had accurate knowledge about the disease. Additionally, 86.5% of participants were willing to take the COVID-19 vaccine, but only 59.4% had accurate knowledge about the vaccine. The study also found that younger age, higher education, and urban residence were associated with better knowledge and more positive attitudes towards COVID-19 and the vaccine (Kapila et al, 2021).

The study suggests that there is a need for targeted education and awareness campaigns to improve knowledge and attitudes towards COVID-19 and the vaccine among PLHIV in Zambia. The study also highlights the importance of addressing health disparities in access to information and healthcare services for vulnerable populations, such as PLHIV (Kapila et al, 2021).

Muwema et al. (2021) conducted a study to assess the factors associated with COVID-19 vaccine acceptance among People Living with HIV (PLHIV) in Zambia. The study was based on a cross-sectional survey of 549 PLHIV who were recruited from three clinics in Zambia.

The study found that the majority of PLHIV (76.1%) were willing to accept the COVID-19 vaccine. The factors associated with vaccine acceptance included: being female, having a higher level of education, having access to social media, having a positive attitude towards vaccines, and having trust in healthcare workers (Muwema et al, 2021).

On the other hand, factors associated with vaccine hesitancy included: being male, having a lower level of education, being unemployed, having a negative attitude towards vaccines, and having concerns about the safety and efficacy of the vaccine (Muwema et al, 2021).

The study concluded that there is a need for targeted vaccine education and awareness campaigns to address vaccine hesitancy among PLHIV, particularly among those who are male, have lower levels of education, and are unemployed. The findings of this study could be useful in developing

strategies to increase COVID-19 vaccine acceptance among PLHIV in Zambia and other similar settings (Muwema et al, 2021).

2.4 Summary of the literature review and gaps identified.

The COVID-19 pandemic has highlighted the importance of vaccination as a means of controlling the spread of the disease. However, there are still research gaps in our understanding of COVID-19 vaccine uptake among people living with HIV (PLHIV) at global, regional, and local (Zambian) levels.

Global research gaps:

1. Lack of data on COVID-19 vaccine efficacy and safety in PLHIV: Most clinical trials of COVID-19 vaccines excluded PLHIV, and there is limited data on vaccine efficacy and safety in this population.
2. Limited information on the impact of COVID-19 vaccines on PLHIV and their HIV treatment: There is a need to understand the impact of COVID-19 vaccines on the immune response of PLHIV and the potential interactions with their antiretroviral therapy.
3. Limited understanding of the factors affecting COVID-19 vaccine uptake among PLHIV: The factors that influence vaccine uptake among PLHIV, such as vaccine hesitancy, fear of side effects, and lack of access to healthcare, are not well understood.

Regional research gaps:

1. Limited data on COVID-19 vaccine acceptance and uptake among PLHIV in different regions: There is a need for more research to understand vaccine uptake and acceptance among PLHIV in different regions, as this can help inform targeted vaccination strategies.
2. Limited understanding of the barriers to COVID-19 vaccine access and uptake among PLHIV: There is a need to understand the barriers that prevent PLHIV from accessing and receiving COVID-19 vaccines in different regions.
3. Limited research on the impact of COVID-19 vaccine policies on PLHIV: There is a need to understand the impact of different COVID-19 vaccine policies, such as vaccine prioritization and allocation, on PLHIV in different regions.

Local (Zambian) research gaps:

1. Limited data on COVID-19 vaccine acceptance and uptake among PLHIV in Zambia: There is a need for more research to understand vaccine uptake and acceptance among PLHIV in Zambia, as this can help inform targeted vaccination strategies.

2. Limited understanding of the factors affecting COVID-19 vaccine uptake among PLHIV in Zambia: The factors that influence vaccine uptake among PLHIV in Zambia, such as vaccine hesitancy, fear of side effects, and lack of access to healthcare, are not well understood.
3. Limited research on the impact of COVID-19 vaccine policies on PLHIV in Zambia: There is a need to understand the impact of different COVID-19 vaccine policies, such as vaccine prioritization and allocation, on PLHIV in Zambia.

In conclusion, while COVID-19 vaccination is essential for controlling the spread of the disease, there are still research gaps in our understanding of vaccine uptake among PLHIV. Addressing these research gaps can help inform targeted vaccination strategies and ensure equitable access to vaccines for all populations.

2.5 Theoretical Framework

The Health Belief Model (HBM) is a theoretical framework that was developed in the 1950s by social psychologists Hochbaum, Rosenstock, and Kegels. It explains how an individual's beliefs and attitudes influence their health behaviours. According to the HBM, health behaviour is determined by a combination of individual beliefs and perceptions about the severity of the illness, the likelihood of contracting the illness, the perceived benefits and barriers of taking preventive measures, and the individual's perceived self-efficacy (Rosenstock, 1974).

The HBM has been widely used in healthcare research and interventions to understand and promote healthy behaviours, including vaccination. The HBM assumes that individuals will take health-protective action if they perceive themselves to be susceptible to a particular health problem, if they perceive that problem as serious, if they believe that taking action will result in specific benefits, and if they perceive that there are few barriers to taking action (Rosenstock, 1974).

In the context of this study on exploring factors affecting vaccine uptake among ART patients at Kapata Urban Clinic in Chipata District, Eastern Province, and the HBM is particularly relevant. The study will explore how the HBM constructs relate to vaccine uptake among ART patients. For example, the study will examine the patients' perceived susceptibility to vaccine-preventable diseases, the perceived severity of the diseases, the perceived benefits of vaccination, the perceived barriers to vaccine uptake, and the self-efficacy of the patients in getting vaccinated (Rosenstock, 1974).

By using the HBM, the study aims to provide a theoretical framework that can guide the exploration of the factors that affect vaccine uptake among ART patients. It will help to identify the beliefs and attitudes that influence ART patients' health behaviours, including their decision to get vaccinated.

The findings from the study can then be used to develop interventions that target these beliefs and attitudes, with the aim of improving vaccine uptake among ART patients (Rosenstock, 1974).

2.6 Conceptual Framework

The conceptual framework for exploring factors affecting vaccine uptake among ART patients at Kapata Urban Clinic in Chipata District, Eastern Province between April 2021 and December 2022 is presented below:

The framework includes several components, including patient characteristics, health system factors, vaccine-specific factors, and external factors that influence vaccine uptake among ART patients.

a) Patient characteristics refer to factors related to the patient, such as age, gender, education, and health beliefs. These factors can influence the patient's decision to get vaccinated.

b) Health system factors include factors related to the health system, such as availability and accessibility of vaccines, vaccine-related policies, and vaccine administration protocols. These factors can affect the ease and convenience of vaccine uptake for ART patients.

c) Vaccine-specific factors refer to factors related to the vaccine itself, such as vaccine efficacy, safety, and side effects. These factors can influence the patient's perception of the vaccine and their willingness to get vaccinated.

d) External factors include social, cultural, and economic factors that can influence vaccine uptake among ART patients. These factors can include family and community support, vaccine misinformation, and financial constraints.

The framework proposes that patient characteristics, health system factors, vaccine-specific factors, and external factors will influence the patient's decision to get vaccinated. The study will use the Health Belief Model (HBM) to guide the exploration of these factors and their relationship to vaccine uptake among ART patients. By using this conceptual framework, the study aims to identify the factors that influence vaccine uptake among ART patients and to develop interventions to improve vaccine uptake in this population.

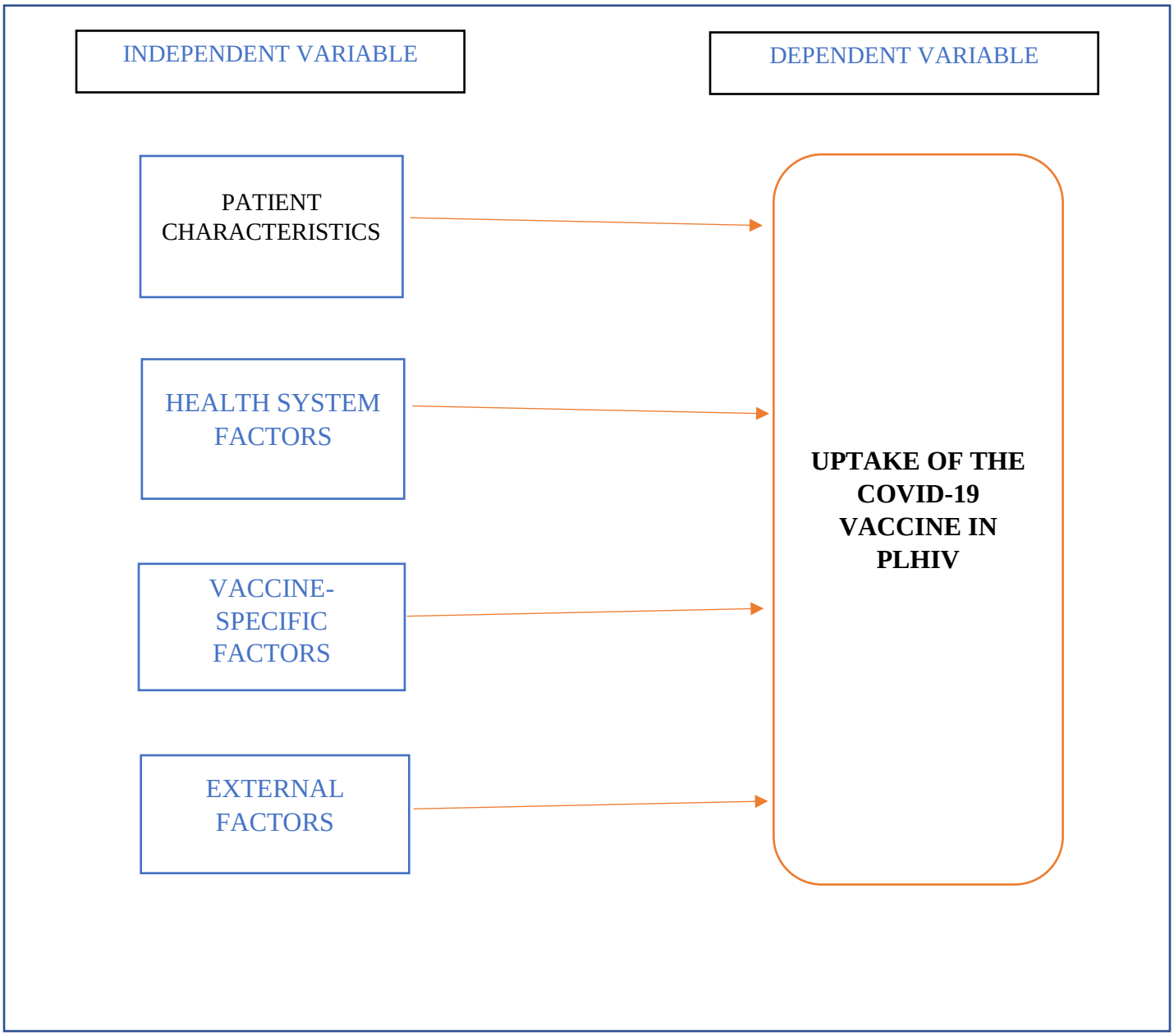


Figure 1: Conceptual framework for exploring factors affecting vaccine uptake among ART patients.

CHAPTER THREE: METHODOLOGY

3.1 Research Approach

This study was a cross- sectional study which was aimed at identifying and understanding the major factors that are at play in hindering a successful COVID-19 vaccine uptake in people living with HIV and provided recommendations that will help in improving the vaccination coverage in order to help curb the pandemic. It used a mixed methodology data collecting methods of both quantitative and qualitative nature to address each of the objectives.

3.2. Research Design

This study was a retrospective study that focused on vaccination data from ART clients at Kapata Urban Clinic between 14thApril, 2021 to 31stMarch, 2023. Both qualitative and quantitative methods were used in the collection of data and also analysis. The data collected and analysed utilised both primary and secondary data from the following sources:

- ART client registers both hard copy and from SMART CARE system.
- ART COVID-19 vaccination registers.
- Physical clients' files in ART to check for a valid vaccination status.
- COVAS vaccine data system.
- Questionnaires both structured.
- Data collected from focused groups.

The participant's inclusion criteria were all ART clients 12 years and older who are currently on treatment at Kapata Urban Clinic ART department and can provide informed consent to participate in the study.

3.3 Research Setting

Kapata Urban Clinic is a health centre located in Chipata District in Eastern Province of Zambia. It has a catchment population of about 53 000 people. Individuals who are currently enrolled in the ART (Antiretroviral Therapy) program at Kapata Urban Clinic in Chipata District are 6,100; of these patients, 6019 are eligible for the covid-19 vaccine. 3982 are fully vaccinated and lastly those are partially vaccine are 486. The target population of the respondents who meets the characteristics of the researcher are individuals eligible for COVID-19 vaccine: 6019 (This includes both fully vaccinated and partially vaccinated individuals, as well as those who have not received any dose as highlighted in the inclusion criteria). 200 workers from Kapata Urban Clinic. The sample is

drawn from the target which will be sampled twice to get. It is approximately 2 km away from the District Health Office. It has two community posts that attend to some of the clients on behalf of the main ART clinic.

3.4 Study Population

The study population of the patients who are eligible for the covid-19 vaccine at Kapata Urban Clinic and are 12 years. A total of target population of 6019 participants will be needed for this study.

Sampling Techniques

The sampling technique chosen for this study is Purposeful sampling for the both quantitative and qualitative approach. Purposeful sampling is a non-probability sampling method where the researcher deliberately selects participants who possess specific knowledge or characteristics relevant to the study's topic. In this case, the researcher is selecting participants who have relevant information about the research topic from the pool of respondents who are eligible for the covid-19 vaccine at Kapata Urban Clinic and are 12 years. Sampling saturation, also known as data saturation or theoretical saturation, is a concept often used in qualitative research. It refers to a point in data collection when new data no longer provides substantially new insights or contributes to the understanding of the research topic. A sample of 50 quantitative and 15 qualitative data points using sampling saturation.

Sample Size

For the sample size determination, a Taro Yamene technique was used. This technique determines sample size from a given population. Therefore, the sample size was determined as follows:

n = N / (1 + N (e) ^2

N= Study Population

n = Sample size

(e) = level of significance

1= Unit constant

n = 6019

6019/1 + 6019(0.05) ^2

6019/1 + 6019 (0.0025)

n = 375.07

n = 375

Therefore, the sample size to be used after calculations was 375 but due to unforeseen circumstances like wrong contact details given by the clients and the Multi-Month Dispensation system currently running in ART made it had. Hence, only managed to interview a total of 50 clients using the convenient sampling method and 15 key informants using purposive sampling method.

3.5 Inclusion and Exclusion Criteria

3.5.1 Inclusion Criteria

ART Patients: Individuals who are currently enrolled in the ART (Antiretroviral Therapy) program at Kapata Urban Clinic in Chipata District, Eastern Province.

COVID-19 Vaccine Uptake: Individuals who have received at least a dose of a COVID-19 vaccine (for example, Pfizer, Moderna, AstraZeneca, Johnson & Johnson, or any other authorized vaccine) and have been recorded in the clinic's vaccination records and those who have not received any dose of the COVID-19 vaccine.

3.5.2 Exclusion Criteria

Individuals who do not fall within the defined case definition, such as individuals who are not ART patients at Kapata Urban.

3.6 Data Collection Tools

3.6.1 Key Informant Interviews

Key informant interviews are qualitative data collection methods that involve engaging with individuals who possess specialized knowledge or experience related to the research topic. In the context of the study on “Factors Affecting COVID-19 Vaccine Uptake among ART Patients” at Kapata Urban Clinic, the key informant interviews focused on healthcare providers, clinic staff, and relevant stakeholders provided valuable insights into the vaccination process and patient interactions.

The key informant interviews were aimed to gain in-depth and nuanced information about various aspects of COVID-19 vaccine uptake among ART patients, particularly from the perspectives of those directly involved in providing healthcare services and implementing vaccination initiatives.

A comprehensive interview guide was developed by the Researcher that included open-ended questions related to various aspects of vaccine uptake. These questions were designed to explore factors such as vaccine awareness, communication strategies employed by the clinic to promote vaccination, challenges faced by ART patients in accessing and accepting vaccines, and any specific initiatives taken by the clinic to improve vaccine uptake.

15 participants were interviewed as key informants which was determined based on the concept of data saturation. This concept refers to the point in the data collection process where additional interviews are unlikely to yield new or relevant information. The researchers will continue conducting interviews until they feel that they have obtained sufficient insights and perspectives from the key informants.

3.6.2 Study Participant Questionnaire

The study participant questionnaire is a structured data collection tool that will be administered to ART patients who meet the inclusion criteria for the study. The questionnaire aims to gather quantitative and qualitative data from a larger sample of ART patients to understand the factors influencing COVID-19 vaccine uptake among this specific population.

The questionnaire will be carefully designed to include both closed-ended and open-ended questions. Closed-ended questions provide respondents with pre-defined response options, allowing for efficient data processing and statistical analysis. These questions may assess variables like demographic information, vaccine history, and access to healthcare services. On the other hand, open-ended questions encourage participants to express their thoughts and opinions freely, providing rich qualitative data on factors that influence their decision-making regarding vaccine uptake 50 respondents will be given questionnaires.

Before conducting the main data collection, the questionnaire will be pre-tested with a small sample of ART patients. This pre-testing phase allows researchers to identify any potential issues with question clarity, relevance, or length. Based on the feedback received during pre-testing, necessary adjustments can be made to ensure the questionnaire is clear, comprehensive, and suitable for the target population.

3.7 Study Variables

3.7.1 Dependent Variable

COVID-19 Vaccine Uptake

This is the primary outcome variable of interest in the study. It represents whether or not ART patients at Kapata Urban Clinic have received at least a dose of a COVID-19 vaccine. It will be measured as a binary variable (e.g., "1" for those who have received the vaccine and "0" for those who have not).

3.7.2 Independent Variables

The independent variables are the factors that researchers hypothesize may influence COVID-19 vaccine uptake among ART patients. These variables can be both categorical and continuous. Some independent variables in this study will include:

a. Socio-demographic Factors:

Age: Categorical variable representing different age groups of ART patients.

Gender: Categorical variable representing male or female participants.

Occupation: Categorical variable classifying participants' occupation types (e.g., employed, unemployed, student, etc.).

b. Clinical Factors: ART Treatment Duration: Continuous variable indicating the length of time participants have been on antiretroviral therapy.

CD4 count: Continuous variable measuring the CD4 T-cell count, indicating the severity of immunosuppression.

c. COVID-19 Vaccine Knowledge and Awareness: Vaccine Knowledge Score: Continuous variable assessing participants' level of knowledge about COVID-19 vaccines (e.g., scored on a scale from 0 to 10). Vaccine Awareness: Categorical variable indicating whether participants are aware of the availability of COVID-19 vaccines.

d. Attitudes and Beliefs: Vaccine Acceptance: Categorical variable indicating participants' willingness to receive the COVID-19 vaccine (e.g., "Yes," "No," "Undecided").

Vaccine Safety Beliefs: Categorical variable representing participants' beliefs about the safety of COVID-19 vaccines (e.g., "Safe," "Unsafe," "Unsure").

e. Barriers and Access: Vaccine Access: Categorical variable indicating the level of accessibility to COVID-19 vaccines (e.g., "Easy," "Moderate," "Difficult").

Vaccine Information Source: Categorical variable representing the primary sources of information about COVID-19 vaccines (e.g., healthcare provider, media, friends/family).

f. Communication and Healthcare Services: Quality of Communication: Categorical variable assessing the effectiveness of communication between healthcare providers and patients regarding vaccines (e.g., "Good," "Fair," "Poor").
Healthcare Utilization: Categorical variable indicating the frequency of healthcare visits for COVID-19 vaccination information.

3.7.3 The Management of the Study Variables

Dependent Variable (COVID-19 Vaccine Uptake):

- Clearly define the criteria for categorizing individuals as “vaccine uptake” or “non-vaccine uptake” based on vaccination records at Kapata Urban Clinic.
- Ensure that vaccination data is collected and recorded accurately from clinic records or other reliable sources.
- Regularly validate and cross-check the vaccine uptake data to minimize errors.

Independent Variables:

- Develop a comprehensive data collection tool (questionnaire) that covers all relevant independent variables.
- For categorical variables (e.g., gender, occupation), use standardized response options to ensure consistency in data collection.
- For continuous variables (e.g., age, ART treatment duration, CD4 count), establish clear guidelines for data recording and avoid data entry errors.

Socio-demographic Factors:

- Maintain consistency in data collection methods and terminology to avoid confusion when recording participants' socio-demographic information.
- Use standardized questionnaires and interview protocols to gather socio-demographic data from participants.

COVID-19 Vaccine Knowledge and Awareness:

- Design questions that accurately assess participants' knowledge of COVID-19 vaccines.
- Validate the questionnaire to ensure that it effectively measures participants' awareness and knowledge of vaccines.

- Train interviewers or data collectors to conduct interviews sensitively to capture nuanced responses.

Attitudes and Beliefs:

- Develop questions that elicit participants' attitudes and beliefs towards COVID-19 vaccination.
- Ensure that the questionnaire covers a comprehensive range of attitude-related factors.
- Consider cultural and contextual differences in attitudes towards vaccination and incorporate relevant cultural considerations into data collection.

Barriers and Access:

- Develop a comprehensive list of barriers that may affect vaccine uptake and assess their impact on participants.
- Use appropriate survey items to capture participants' perceptions of vaccine accessibility and barriers.
- Collect qualitative data (e.g., through open-ended questions) to gain deeper insights into barriers faced by ART patients.

Communication and Healthcare Services:

- Design questions that measure the quality of communication between healthcare providers and patients regarding vaccines.
- Ensure that questions related to healthcare utilization capture the frequency and nature of healthcare visits for vaccination-related information.
- Consider conducting interviews with healthcare providers to gain their perspectives on communication challenges and strategies.

Data Validation and Quality Control:

- Implement data validation procedures to check for outliers and inconsistencies in the data.
- Conduct regular data quality checks to identify and correct errors in data entry and recording.
- Have a designated data manager or team responsible for overseeing data quality.

Data Analysis:

- Use appropriate statistical methods to analyze the data, considering the type of variables (e.g., chi-square tests for categorical variables, t-tests or ANOVA for continuous variables).

- Conduct thorough statistical checks to verify the accuracy of the data analysis process.

3.4 Data collection

Secondary Data

Secondary data for this research will include recently published research findings of previous related studies and other published documents relating to the research topic. Secondary data are important because they readily supply empirical data that is collected and analysed by other researchers. It will also be used to identify possible gaps in the previous studies. The chief and preferred source of secondary data for this research will be the internet because it is readily accessible in providing research studies and other documents done by other scholars.

Primary Data

Primary data are important because they provide empirical evidence elicited from the respondents. An interview guide will be used to collect information relating to the research objectives reasons being that the interview guide will allow the conversations to flow naturally, meaning that questions will not necessarily be asked in order. Additionally, with regard to the interview guide, it will give an opportunity to the researcher(s) to go off-script. Hence, this will facilitate the collection of the latest and up to date information regarding the existing scenarios on the topic of study.

3.5 Data analysis

Data analysis is the reduction and accumulation of data to manageable size, developing summaries, looking for patterns and applying statistical techniques. Data analysis is important as it will enable the researcher to establish consistent patterns with the data collected. Data will be analysed with the use of quantitative and qualitative approaches of data collection.

The data that will be collected will be analysed using quantitative data analysis techniques. Quantitative data analysis methods will be employed because of the data collected from closed ended questions which are already categorized and are much amenable to various quantitative methods. The preferred quantitative data analysis method for this study will be two computer data analysis Software's namely Statistical Package for Social Sciences (now known as Statistical Product and Service Solutions, SPSS) and Microsoft Excel. The choice of these software's will have warranted consistency, uniformity and accuracy in the analysis of quantitative data.

Descriptive statistical analysis will be used to calculate the mean, median, skewness, variance and standard deviation. Frequencies and percentages will be calculated for categorical variables. A Chi-square test will be used to compare categorical variables in univariate analysis. Inferential statistics was used for hypothesis testing. Correlation analysis and regression analysis was used to determine the relationships between variables and the cause and effect that may exist between variables collected in the data sets.

Therefore, thematic analysis will be used to analyse qualitative analysis which the collected data as it emphasizes, identifies, examines and records patterns or simply themes within the data collected. Themes are patterns across data sets that are important to the description of the phenomenon and are associated to a specific research questions. The themes will be put in categories for data analysis. The data which will be collected from the field will be analysed as follows.

The researcher first will familiarize themselves with the data which will be collected by reading through all the interview guides and listening to the recordings in order to understand the in depth of the data. Reading through all the interview guides and listening to the recordings of the data collected does not only help to understand the in-depth of the data collected but also helps in generating the initial codes of the data.

After the researcher familiarize themselves with the data they will collect, the data will then have to be coded. This entails that the researcher will identify features from the data that will appear of interest to the research study which will be then be compressed into easily understandable concepts, properties or patterns for more efficient data analysis process. In addition to this, labels will then be given to the codes or the identified features which will of importance to the study and this come from the most frequently given answers from the interview guides and the recordings.

The researcher will then sort out the identified codes according to their relationship or similarities to form the themes. This means grouping the identified codes together based on their similarities by way of using blocks. Thereafter, the themes will be reviewed or refined to ensure that what will be considered as themes are actually themes. Reviewing of the themes will also enable the researcher to combine similar themes or to separate some themes to ensure that they are mutually exclusive thereby ensuring coherent and meaningful of the themes.

Thereafter, the researcher will then define and name the themes. This entails identifying the essence of what each of the theme is all about and also to determine what aspect of the data that each of the themes will capture. Furthermore, this will help in writing a well detailed analysis of the study and how it will fit into the overall research objectives. Validation will be equally done as it is the pillar of successful research and it will be done throughout the research process. The purpose of this is that it will enable the researcher to check the accuracy of the design or method been used and also the extent to which the procedures been used would produce consistent and dependable results.

Finally, the researcher will then report the findings from the statistics based on the themes made in response to the research objectives.

3.6 Ethical Consideration

The following procedures will be carried out to ensure that no harm comes to the participants of this study as a result of their participation.

1. Approval from the clinic: I will seek approval from the District Health Office and clinic to collect data before conducting the study.
2. Informed Consent: All participants will be informed of the purpose of the study and what is involved of them through the Informed Consent Form that will be affixed to the questionnaire and interview guide. In this form, participants will be given the option to opt out of completing the questionnaire or the interview guide.
3. Confidentiality: I will treat the information provided during the study with utmost confidentiality. The identities of the participants will not be captured.
4. Potential harm and benefits: Participants will be assured that no harm will come to them because of participating in this study and I will make it clear to them the benefits one stands to gain as a participant.

CHAPTER FOUR: DATA PRESENTATION

4.1. Introduction

This chapter presented data obtained from the study with regards to explore factors affecting the vaccine uptake among ART patients at Kapata clinic between April 2021 and March 2023. The presentation of the data on the respondent's information and objectives of the study were made through frequency tables, charts and through narrations from the respondents. The sample size which was chosen through a saturation which was 65 respondents which 50 attempted the questionnaires and 15 participants were interviewed.

4.2. Demographics Analysis

In a demographic analysis, out of 50 participants who completed questionnaires, 33 (66%) were female, 15 (30%) were male, and 2 (4%) did not specify their gender (as indicated in Figure 2). Among the 15 participants who were interviewed, which constituted a subset of the research population including both males and females, 9 were male and 6 were female.

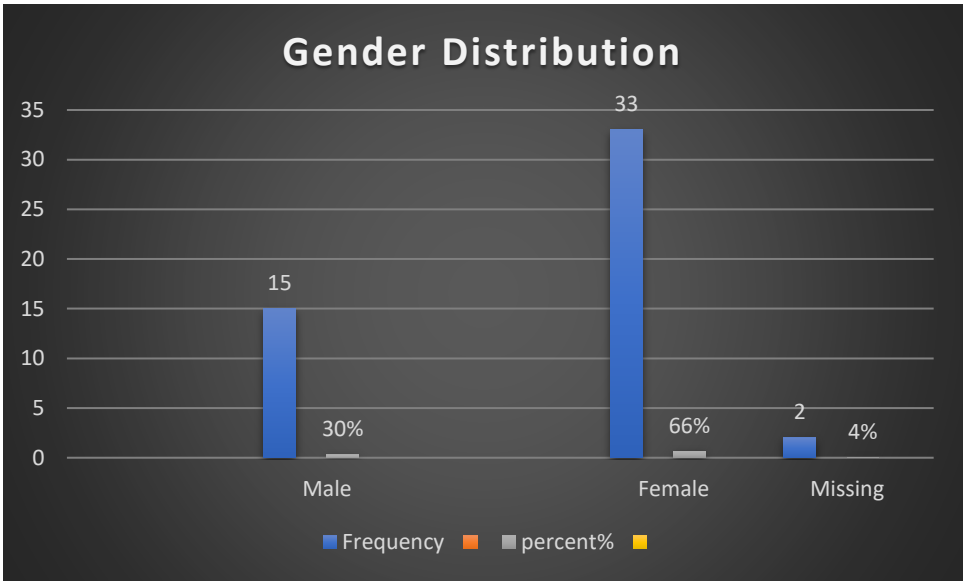


Figure 2: Gender Distribution

The age of the respondents was divided into 3 categories being 19 to 24 years, above 35 and those whose age was missing. The age group with the highest number of participants was above 35 with a total of 40 (80%), followed by the age group 19 to 34 which comprised 9 respondents giving us a percentage of 18% and 1 with missing age (see figure 3).

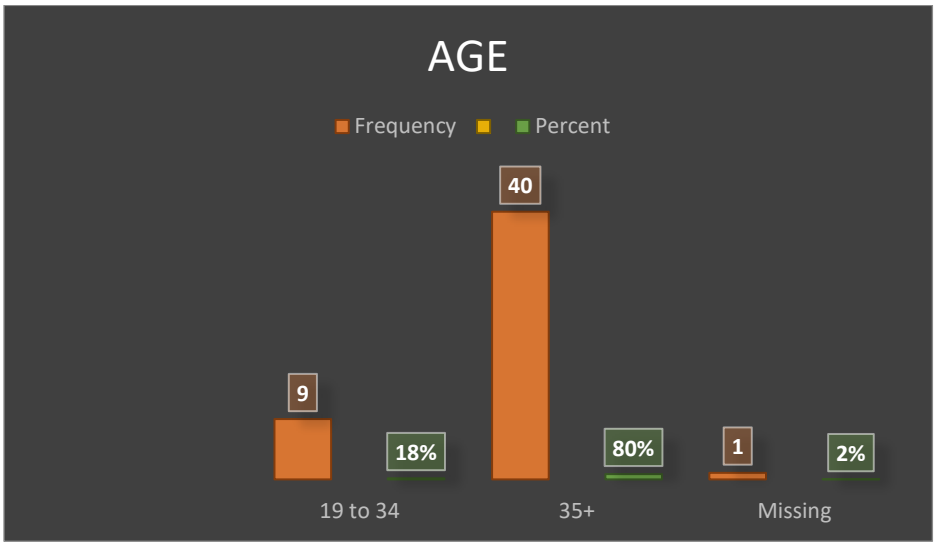
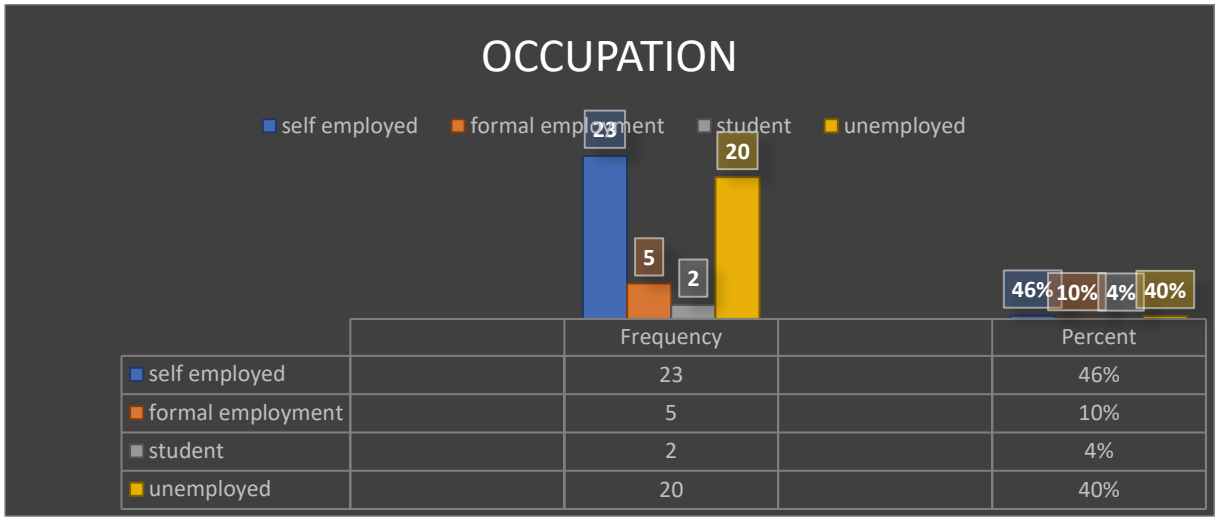


Figure 3: Age Distribution

Occupation of the participants was grouped as follows: self-employed, formal employment, student and unemployed. The category with the highest number of respondents was self-employed with 23 giving a percentage of 46% from the total number of participants sampled and students having the lowest with 2(4%). See figure 4



		Frequency		Percent
self employed		23		46%
formal employment		5		10%
student		2		4%
unemployed		20		40%

Figure 4: Occupation of Participants

Finally, from the 50 respondednts who attempted the questionnairres, 30 which translates to 60% were married and the lowest number of participants was 5 translating to 10% were either divorced or widowed.

4.2.1. Objective 1: Proportion of PLHIV currently on treatment and eligible for covid-19 vaccination

The Data collection focused on determining the proportion of HIV-positive individuals eligible for COVID-19 vaccination at Kapata Urban Clinic. Table 1 displays the current treatment and eligibility data from the COVAX database. All the clients sampled were HIV positive and were eligible for COVID-19 vaccination. However, out of 50 clients, one client had a missing result about the question on taking ART. In a sample of 50 individuals, 37 (74%) were diagnosed with COVID-19, while 13 (26%) tested negative for the virus.

Table 1: Proportion of PLHIV currently on treatment and eligible for covid-19 vaccination

Status	**Number**
Tx Current	6100
Eligible for Vaccine	6019
Fully vaccinated	3983
Partially vaccinated	486

The table presents reasons for vaccine hesitancy among a sample of 50 individuals. It indicates that 50% of the respondents cited fear of vaccine side effects as their primary concern, while 40% expressed doubts about the effectiveness of vaccines. Additionally, 10% of the participants did not provide a specific reason, marked as "Missing." In total, these reasons collectively represent the factors influencing vaccine hesitancy in this sample.

Table 2: Reasons for not receiving vaccinations.

Reasons	Frequency	Percent
I am afraid of the side effects	25	50%
I do not believe in the vaccines' effectiveness	20	40%
Missing	5	10%
Total	50	100%

4.2.2. Objective 2: The Rate of COVID-19 vaccine uptake at Kapata Urban Clinic

Figure 4.5 shows if the respondents received any information about the covid-19 vaccination from the clinic which was depicted that 48 (96%) of the respondents said yes and 2 (4%) said no they didn't receive any information.

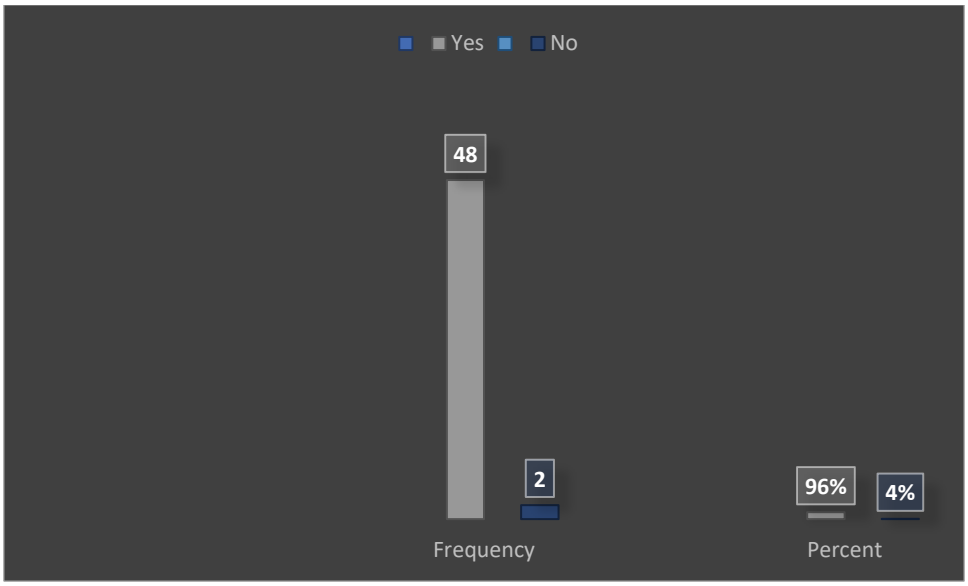


Figure 5: Information about COVID-19 vaccinations

The table outlines the reasons behind vaccine hesitancy among a group of 50 individuals. It reveals that 40% of respondents cited time constraints as a primary factor, while 26% mentioned medical reasons such as allergies or health conditions. Additionally, 20% indicated limited access to transportation as a barrier to getting vaccinated. A smaller percentage, 10%, expressed concerns about vaccine safety, and only 4% attributed their hesitancy to a lack of information about the vaccine. These findings collectively represent the various factors contributing to vaccine hesitancy in this sample.

Table 3: Reasons of fear of vaccinations.

Reasons	**Frequency**	**Percent**
Concerns about vaccine safety	05	10%
Lack of information about the vaccine	02	04%
Medical reasons (e.g., allergies, health conditions)	13	26%
Limited access to transportation	10	20%
Time constraints	20	40%
Total	50	100%

Challenges in accessing COVID-19 vaccination.

This table highlights the challenges faced by a group of 50 individuals in accessing COVID-19 vaccination. The data indicates that 44% of respondents were not interested in receiving the vaccine. Furthermore, 30% cited a lack of time as a barrier, while 16% faced the obstacle of a long distance to vaccination facilities. A smaller portion, 10%, reported encountering vaccine stockouts

as a challenge. These findings collectively represent the key barriers to accessing COVID-19 vaccination in this sample.

Table 4: Reasons for not taking up COVID-19 vaccine

Challenges in accessing COVID-19 vaccination	Frequency	Percent
Lack of time	15	30%
Long distance to facility	8	16%
Vaccine stock out	5	10%
Not interested	22	44%
Total	50	100%

4.2.3. Objective 3: The factors affecting COVID-19 vaccine uptake at Kapata Urban Clinic

The table provides an overview of individuals' confidence levels in the effectiveness of the COVID-19 vaccine, as measured on a scale from 1 (Not at all confident) to 5 (Extremely confident). Most respondents, comprising 52%, expressed the highest level of confidence, rating themselves as "Extremely confident" in the vaccine's effectiveness. Additionally, 20% indicated being "Very confident." Smaller proportions of the sample reported moderate (8%), slight (14%), and no confidence (6%) in the vaccine's efficacy. These responses collectively reflect the varying degrees of confidence in the COVID-19 vaccine within this group of 50 individuals.

Table 5: Confidence in the effectiveness of the vaccine.

Confidence in the effectiveness of covid-19 vaccine	**Scale**	**Frequency**	**Percent**
Not at all confident	1	3	6%
Slightly confident	2	7	14%
Moderately confident	3	4	8%
Very confident	4	10	20%
Extremely confident	5	26	52%
Total	-	50	100%

Out of 50 respondents, 68% reported experiencing side effects after COVID-19 vaccination. Fever was the most common side effect at 36%, followed by headache at 24%, pain at the injection site at 20%, and fatigue and muscle aches, each at 10%. This data offers insight into side effect prevalence among this group.

Table 6: Common COVID-19 side-effects

Side effects of covid-19 vaccine	**Frequency**	**Percent**
Fatigue	5	10%

Fever	18	36%
Headache	12	24%
Muscle aches	5	10%
Pain at the injection site	10	20%
Total	50	100%

QUALITATIVE RESULTS

Views of the Facility Staff on factors affecting COVID-19 vaccine uptake at Kapata Urban Clinic.

Following the interviews, the data was collected on participants' position they served at Kapata Urban Clinic, and this is presented below for the 15 participants respectively. Two (2) participants were Data Analyst (M&E), two (2) were Medical Doctors and four (4) were Nurses, two (2) participants were Pharmacists, two (2) were Administrative Staff and three (3) were supporting staff.

Objective 1: proportion of people living with HIV currently on treatment and eligible.

In interviews aligned with our primary objective, participants were asked about current practices for identifying eligible individuals with HIV for COVID-19 vaccination at Kapata Urban Clinic.

- Respondents indicated reliance on Ministry of Health (MOH) protocols and national guidelines, subject to regular updates in response to evolving circumstances. Eligibility criteria encompass CD4 count, viral load, overall health status, current medication regimen, age, and willingness to be vaccinated. Healthcare providers at Kapata Urban Clinic, who administered COVID-19 vaccines to People Living with HIV, reported positive outcomes. Patients expressed relief and gratitude, recognizing the vaccine's importance in preventing severe illness. Few adverse reactions were observed, bolstering vaccine safety perceptions.

Objective 2: Ascertain the rate of COVID-19 vaccine uptake at Kapata Urban Clinic

The participants (healthcare workers) were asked questions regarding the rate of vaccine uptake at the clinic.

- The study ascertained whether improper communication was a barrier to vaccine uptake. However, respondents indicated that effective communication between healthcare providers and participants at the clinic was routinely done. The information provided was

accurate, built trust through transparency, and offered tailored, empathetic messaging to addresses patient concerns, dispels fears, and encourages vaccination acceptance.

- Concerning vaccine availability, respondents highlighted that they had enough vaccines, access to proper equipment, including syringes and cold storage facilities. Therefore, inadequate supply of vaccines was not a barrier to vaccine uptake.

Objective 3: To explore the factors affecting COVID-19 vaccine uptake at Kapata Urban Clinic

- To ascertain whether socio-cultural and religious beliefs impact the willingness of patients to receive the COVID-19 vaccine, the providers stated that socio-cultural and religious beliefs could affect patients' COVID-19 vaccine willingness, including concerns about safety, healthcare system mistrust, or religious objections. They addressed this concern through open dialogue, accurate information, and collaboration with community leaders to promote vaccine acceptance. Collaborative information sessions with community leaders and organizations were strategies used to address misinformation.
- To ascertain the potential sources of support and resources that could be provided to patients, respondents highlighted sufficient resources, targeted funding, collaboration with community organizations, healthcare provider training, and partnerships with HIV clinics to support COVID-19 vaccination efforts among PLHIV.

CHAPTER FIVE: DISCUSSION OF THE RESEARCH FINDINGS

This chapter attempts to discuss the findings of the study which is aimed to explore factors affecting the vaccine uptake among ART patients at Kapata Urban Clinic in Chipata District, Eastern Province between April 2021, and December 2022.

5.1 The proportion of people living with HIV currently on treatment and eligible.

- There were 6,100 PLHIV at Kapata clinic out of which 6,019 individuals were eligible for vaccination against COVID-19. However, only 3,983 people were fully vaccinated, while 486 individuals were partially. These results show that only 72.4% of the clients were fully or partially vaccinated. The data of PLHIV at Kapata clinic revealed that all participants had HIV and were on treatment, demonstrating the clinic's effective HIV care. Additionally, all 50 participants (100%) were eligible for COVID-19 vaccination, indicating no age-related barriers. Notably, 74% of participants had been diagnosed with COVID-19, emphasizing the need for vaccination to protect against severe outcomes, as well-managed HIV may improve COVID-19 vaccination outcomes.

  According to Mudenda et al (2022) reviewed that knowledge of vaccine and vaccine availability. This study found that the adult population in Zambia exhibited a high level of awareness at 99% regarding the COVID-19 vaccine, but the acceptance of the vaccine was notably low at just 33%. This suggests that a significant proportion of Zambians were hesitant to receive the COVID-19 vaccine. The results of this research offer valuable insights for developing and executing strategies aimed at enhancing individuals' willingness to get vaccinated. Further, another study by Muhindo et al (2022), which examined the COVID-19 vaccine acceptability, and uptake among people living with HIV in Uganda found that it was high and positively associated with greater vaccine confidence, and perceived easiness to obtain the vaccine. Building vaccine confidence and making vaccines easily accessible should be a priority for vaccination programs targeting PLWH.

  These results differ from the findings at Kapata as the coverage was at 69%. Mudenda et al (2022) ascribed the observed low acceptance rates in their investigation to participant skepticism regarding potential negative impacts and efficacy of the COVID-19 vaccine. Moreover, the relatively lower count of confirmed COVID-19 cases in Zambia during the study duration might have further fueled vaccine hesitancy. In contrast, other research studies documented greater acceptance of COVID-19 vaccines in countries where the pandemic had a more severe impact, instilling a heightened fear of contracting the virus (Mudenda et al, 2022). Nevertheless, there is need to increase vaccination

uptake in Zambia. Generally, COVID-19 vaccination knowledge was high at the facility. This is in line with the two studies that have been outlined above. However, there is need to translate the high knowledge of COVID-19 knowledge into vaccination for PLHIV.

5.2 The Rate of COVID-19 vaccine uptake at Kapata Urban Clinic

- The data from the registers at Kapata Urban Clinic shows that out of 6,100 people currently undergoing treatment, 3,982 have received all required doses of the COVID-19 vaccine, and 486 have received only some doses. This translates to a 65.3% vaccination rate among individuals with HIV in treatment. Additionally, the study found that 74% of respondents had received the COVID-19 vaccine at the same clinic. This indicates a high level of vaccine acceptance in this group, suggesting that many people with HIV are willing to get vaccinated to protect themselves from COVID-19.

  A study by Nery et al. (2022) examined the COVID-19 vaccine hesitancy and associated factors according to sex in a population-based survey in Salvador, Brazil. Its key findings were that among 2,521 participants, 81.4% reported willingness to use a COVID-19 vaccine and 18.6% hesitated to take it. Among those intending to get vaccinated 68.2% would pay for the vaccine if necessary. Key findings were that vaccine hesitancy was relatively low between the first and second COVID-19 peaks. Gender influenced hesitancy, with distinct factors for men and women. This suggests the need to tailor health policies and campaigns, considering gender differences, to boost COVID-19 vaccination and address concerns.

  Uptake was generally high among the women than men in the participants from Kapata. However, this can be attributed to the proportion of men to women in our sample. Furthermore, unlike the Brazilian study by Nery and colleagues which found that men were less likely to hesitate about using the vaccine than women. However, the findings among women, that higher educational level and high perception of COVID-19 risk were associated with less vaccine hesitancy did not differ from the findings of our study.

5.3 To explore the factors affecting COVID-19 vaccine uptake.

- This study explored some challenges to vaccine uptake. Specifically, the categories examined where long distance, lack of time, vaccine stock outs, and those not interested. The findings showed that 44% of the candidates sited lack of interest as a barrier for them to take up covid 19 vaccination;

30% stated lack of time to visit the facility as a barrier; 16% bemoaned the long distance to the facility as a barrier; and a smaller portion, 10%, reported encountering vaccine stockouts as a challenge. These findings collectively represent the descriptive proportions of the the key barriers to accessing COVID-19 vaccination in this sample. Furthermore, 15 clients were interviewed to try to understand how these barriers affected their uptake of COVID-19 vaccinations. In addition, results of a Likert scale showed that about 80% of the clients were generally confident in the effectiveness of the vaccine to prevent COVID 19, living 20% of the sample not believing in the effectiveness of the vaccines.

1. Hesitancy and Side Effects

The study highlighted that one of the factors that influenced the uptake of the vaccine in PLHIV was confidence in the effectiveness of the vaccine. The data revealed a positive trend, with most respondents indicating high confidence in the vaccine's effectiveness. However, the study showed that 68% of the participants experienced some form of side effects after receiving the Covid -19 vaccine and 32% reporting not having any side effects. Similarly, Sulaiman et al, (2021) conducted a study that COVID-19 vaccine hesitancy among people living with HIV in a low resource setting. In this study, they observed a high COVID-19 vaccine hesitancy rate of 57.73% among COVID-19 unvaccinated PLHIV and identified factors independently associated with COVID-19 vaccine hesitancy, including age, sex, employment status, experiencing side effects of ART, participants' belief regarding their risk of contracting COVID-19, and ART clinic. 68% agreed or strongly agreed that the potential adverse effects of the vaccine were a reason for their hesitancy. This finding is like our results that a huge number – approximately 40% of PLHIV showed lack of interest in the vaccine. Further probing of these clients showed that 'fear of side effects' was a key determinant of this lack of interest in the vaccine. One client stated that "…I have heard that the vaccine is attributed to the 666 satanic proclamations in the bible…" while another candidate stated that "…I fear that I may become impotent if I receive this vaccine. My friend who received it has been experiencing bedroom problems…"

2. Vaccine Stock-Outs

Tagoe et al., (2021) examined the 'national stakeholder views on challenges, barriers, and potential solutions COVID-19 vaccination in lower-middle income countries.' Key findings from this study were that most stakeholders had emphasized issues related to the

purchase of an adequate number of COVID-19 vaccine doses. They pointed out that the government had insufficient funds to procure vaccines, donor funds were decreasing, and there was a lack of availability of vaccines, which presented significant obstacles to low- and middle-income countries (LMICs) in their vaccination programs. The stakeholders believed that acquiring COVID-19 vaccines had been more challenging than acquiring other vaccines in the past due to the high global demand for COVID-19 vaccines by all countries. These findings partly echo the challenges clients at Kapata faced. During the second wave of COVID 19, there was an inadequate supply of vaccines. However, at the time of this study, the supply of vaccines had normalized, and several were expiring due to lack of candidates to vaccinate. This points to lack of communication from the facility health workers or the incorrect perception of vaccine status by the PLHIV.

3. Lack Of Time and Long Distance to The Clinic

About 30% of the clients indicated that they did not have time to visit Kapata clinic because they lacked time to visit the facility. As can be seen from table 2, most of the respondents (86%) were unemployed. These communities engage in the informal sector activities such as farming. Therefore, they spend a lot of time away from their homes in the fields. This problem is like what was observed in a study by Iyengar et. al., (2022) which examined the Black, Asian and Minority Ethnic (BAME) participation in the COVID 19 vaccination drive. It findings were that the intention of vaccination in the UK population was around 82% stating they were likely or very likely to take up a COVID-19 vaccine. This statistic was different from the intentions of the BAME community to be vaccinated. Hesitancy was highest in black or black British ethnic groups, with 72% stating they were unlikely to be vaccinated followed by people of the Pakistani/Bangladeshi ethnicity (42%). However, when vaccination services were brought closer to these clients, the likelihood to take up vaccinations increased to 67%. Similarly, Kapata clinic needs to devise community vaccination drives targeting these clients to improve their uptake. A study by Bobo and colleagues entitled “Leveraging HIV Program and Civil Society to Accelerate COVID-19 Vaccine Uptake, Zambia” indicated that Zambia had developed community drives to reach out to all PHIV by integrating COVID-19 vaccination into its existing HIV treatment centres with the goal of offering patients and family members vaccination services, thereby rapidly expanding static vaccination site numbers in the country. Successful strategies for engaging HIV treatment centres included using existing human resources by adequately

preparing HIV healthcare workers to offer vaccination and encouraging them to get vaccinated themselves, developing targeted promotional materials for persons living with HIV who are at increased risk for severe illness (Bobo et. al., 2022).

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The purpose of this chapter is to conclude on the findings of the study and make recommendations based on the research findings. The conclusion is directly linked to the aim of the Study, and it has highlighted the factors affecting the vaccine uptake among ART patients at Kapata Urban Clinic in Chipata District, Eastern Province between April 2021 and December 2022.

6.2 Conclusion

The findings from the three objectives shed light on critical aspects of COVID-19 vaccination among people living with HIV at Kapata Urban Clinic. These insights provide a comprehensive understanding of the challenges, opportunities, and strategies to enhance vaccine uptake and improve overall public health outcomes.

Objective 6.2.1. The Proportion of PLHIV C on Treatment/COVID-19 Vaccination

The findings indicate that 100% of ART patients living with HIV were eligible for the COVID-19 vaccine. This suggests that HIV-positive individuals on antiretroviral therapy (ART) are a suitable target group for COVID-19 vaccination. Furthermore, there is a significant population within the clinic's reach that can benefit from vaccination. However, barriers such as fear of side effects and lack of belief in vaccine effectiveness exist, which need to be addressed through targeted communication and education efforts.

Objective 6.2.2. The Rate of COVID-19 Vaccine Uptake at Kapata Urban Clinic

The study reveals that 74% of the respondents received the COVID-19 vaccine at Kapata Urban Clinic. This indicates a substantial proportion of vaccine acceptance within this population, suggesting that a significant number of people living with HIV are willing to take steps to protect themselves against COVID-19. Effective communication emerges as a cornerstone for vaccine uptake. While the majority of respondents expressed confidence in the vaccine's safety and effectiveness, challenges in accessing the vaccine were reported. Improving vaccine availability, enhancing communication strategies, and streamlining the vaccination process can contribute to a higher rate of vaccine uptake. Collaboration among healthcare providers, community leaders, and stakeholders is pivotal in addressing these challenges.

Objective 6.2.3. Factors Affecting COVID-19 Vaccine Uptake at Kapata Urban Clinic

On the Confidence in the Effectiveness of the Vaccine, a significant proportion (52%) reported being "Extremely confident," demonstrating a strong belief in the vaccine's ability to protect against

COVID-19. Side Effects after Receiving the COVID-19 Vaccine, a majority of respondents (68%) reported having experienced side effects. Specific Side Effects of the COVID-19 Vaccine, the most common side effects reported were fever (36%) and headache (24%).

6.3 Recommendations

Based on the research findings, several recommendations can be made to address the factors affecting the vaccine uptake among ART patients. There is a need for comprehensive strategies to enhance COVID-19 vaccine uptake among ART patients at Kapata Urban Clinic. These strategies should focus on addressing barriers to access, improving communication and education about the vaccine, addressing concerns and misconceptions, and providing necessary resources and support.

Collaborative efforts involving healthcare providers, community organizations, and policymakers are essential for successful vaccine implementation and uptake. Some of the strategies to be developed to help scale up vaccinations among people living with HIV would be: Integrating COVID-19 screening and vaccination within existing services under ART, engaging PLHIV and community leaders into COVID-19 vaccination planning, roll out and monitoring and the lastly, making sure to counter any misinformation that might exist and generate demand for COVID-19 vaccination through trusted peers, health workers, social media influencers, and online advertising campaigns.

Recommendations for future research include conducting further studies to explore the specific reasons behind concerns about vaccine safety and effectiveness, conducting qualitative research to gain a deeper understanding of individual experiences and beliefs, and evaluating the impact of targeted interventions on vaccine uptake among this population.

6.4 Research Limitations

The first limitation of the study was that most of the contact details provided by the ART clients were either numbers that don't exist or wrong numbers. This made communication with the clients informing them about taking part in the study very hard hence relying on those walk ins at the Clinic. The second limitation was in the research proposal it was proposed that objective number 3 would CHI test to analyse the categorical data, T-test to analyse Continuous data and perform logistic analysis to assess association. This was not done for this type of study didn't need these methods but rather just exploring the factors that affect COVID-19 vaccine uptake in people leaving with HIV at Kapata Urban Clinic

CHAPTER SEVEN: REFERENCES

1. Bono, S.A., Faria de Moura Villela, E., Siau, C.S., Chen, W.S., Pengpid, S., Hasan, M.T., Sessou, P., Ditekemena, J.D., Amodan, B.O., Hosseinipour, M.C. and Dolo, H., 2021. *Factors affecting COVID-19 vaccine acceptance: an international survey among low-and middle-income countries. Vaccines*, *9*(5), p.515.
2. Brown et al. 2021.*COVID-19 vaccine uptake in people living with HIV in the UK. Lancet HIV*. 8(9): e542-e549.
3. Cardoso et al. 2021. *COVID-19 vaccination in people living with HIV in Brazil: a multicenter observational study*. Lancet HIV. 8(11): e741-e749.
4. Forni, D., Cagliani, R., Clerici, M. and Sironi, M., 2017. *Molecular evolution of human coronavirus genomes. Trends in microbiology*, *25*(1), pp.35-48 https://www.who.int/health-topics/coronavirus#tab=tab_1
5. Jassat, W., Cohen, C., Tempia, S., Masha, M., Goldstein, S., Kufa, T., Murangandi, P., Savulescu, D., Walaza, S., Bam, J.L. and Davies, M.A., 2021. *Risk factors for COVID-19-related in-hospital mortality in a high HIV and tuberculosis prevalence setting in South Africa: a cohort study*. The Lancet HIV, 8(9), pp. e554-e567https://www.who.int/news/item/15-07-2021-who-warns-that-hiv-infection-increases-risk-of-severe-and-critical-covid-19
6. Kapila, G. N., Munsaka, S. M., Nanzaluka, F. H., & Mudenda, J. N. (2021). *Knowledge, attitudes, and perceptions of COVID-19 and the COVID-19 vaccine among people living with HIV in Zambia.* Journal of Community Health, 46(6), 1241-1248. doi: 10.1007/s10900-021-00996-7.
7. Makukula, Z. G., Musonda, P., Michelo, C., Mweemba, O., & Nalubamba, M. (2021). *COVID-19 vaccine uptake among people living with HIV in Zambia: a cross-sectional study. BMC infectious diseases,* 21(1), 1184. doi: 10.1186/s12879-021-06701-4
8. Malapela, R.G., Thupayagale-Tshweneagae, G. and Baratedi, W.M., 2023. *Use of home remedies for the treatment and prevention of coronavirus disease: An integrative review. Health Science Reports*, *6*(1), p.e900 https://covid19.who.int/?mapFilter=vaccinations
9. Muwema, J. B., Nalubamba, M., Chisenga, C. C., & Musonda, P. (2021*). Factors associated with COVID-19 vaccine acceptance among people living with HIV in Zambia*. Journal of Community Health, 46(6), 1233-1240. doi: 10.1007/s10900-021-00994-9.
10. Mwamba, C. P., Nkamba, H. C., Sikazwe, I., & Katepa-Bwalya, M. (2021). *Acceptability of the COVID-19 vaccine among healthcare workers and people living with HIV in Zambia.* International Journal of Infectious Diseases, 111, 128-130. doi: 10.1016/j.ijid.2021.09.076.

11. Nakigozi G, Makumbi FE, Buregyeya E, et al. (2021). *COVID-19 Vaccine Acceptability and Hesitancy Among HIV-Positive Individuals in Uganda: A Nationwide Survey*. J Acquir Immune Defic Syndr. 2021;88(5):622-629. doi: 10.1097/QAI.0000000000002751.
12. Park, S. Y., Lee, J. S., Son, J. S., Ko, J. H., Peck, K. R., Jung, Y., ... & Shi, H. (2019). *Post-exposure prophylaxis for Middle East respiratory syndrome in healthcare workers*. *Journal of Hospital Infection*, *101*(1), 42-46 https://www.bing.com/search?q=cumulative+number+of+covid-19+cases+by+2022&form=ANNTH1&refig=239577afff4243b4be804a2116f473f9
13. Rosenstock, I. M. (1974*). Historical origins of the health belief model. Health Education & Behavior*, 2(4), 328-335.
14. Semeere et al. *2021Acceptability and willingness to receive COVID-19 vaccines among people living with HIV in sub-Saharan Africa*. Vaccines.;9(8):840.
15. Serota et al. (2021). *COVID-19 Vaccination and Vaccine Hesitancy Among People Living with HIV in the US.* Open Forum Infect Dis.;8(9): ofab399
16. Sheahan, T.P., Sims, A.C., Leist, S.R., Schäfer, A., Won, J., Brown, A.J., Montgomery, S.A., Hogg, A., Babusis, D., Clarke, M.O. and Spahn, J.E., 2020. *Comparative therapeutic efficacy of remdesivir and combination lopinavir, ritonavir, and interferon beta against MERS-CoV*. *Nature communications*, *11*(1), p.222
17. Song, Y., Zhang, M., Yin, L., Wang, K., Zhou, Y., Zhou, M. and Lu, Y., 2020. *COVID-19 treatment: close to a cure? A rapid review of pharmacotherapies for the novel coronavirus (SARS*-CoV-2). *International journal of antimicrobial agents*, *56*(2), p.106080.
18. Toro-Ascuy, D., Cifuentes-Muñoz, N., Avaria, A., Pereira-Montecinos, C., Cruzat, G., Peralta-Arancibia, K., Zorondo-Rodríguez, F. and Fuenzalida, L.F., 2022. *Factors influencing the acceptance of COVID-19 vaccines in a country with a high vaccination rate. Vaccines*, *10*(5), p.681.
19. Wang, J., Jing, R., Lai, X., Zhang, H., Lyu, Y., Knoll, M.D. and Fang, H., 2020. *Acceptance of COVID-19 Vaccination during the COVID-19 Pandemic in China. Vaccines*, *8*(3), p.482.
20. Wiid JA, Theron G, Ellis JH, et al. (2021). *COVID-19 vaccine hesitancy in the South African population.* J Med Virol.;93(9):5261-5266. doi: 10.1002/jmv.27284.
21. Woo, P.C., Lau, S.K., Lam, C.S., Lau, C.C., Tsang, A.K., Lau, J.H., Bai, R., Teng, J.L., Tsang, C.C., Wang, M. and Zheng, B.J., 2012. *Discovery of seven novel Mammalian and avian coronaviruses in the genus Deltacoronavirus supports bat coronaviruses as the gene source of alphacoronavirus and Betacoronavirus and avian coronaviruses as the gene source of Gammacoronavirus and Deltacoronavirus*. *Journal of virology*, *86*(7), pp.3995-4008.
22. Zhao, S., Zhang, H., Yang, X., Zhang, H., Chen, Y., Zhan, Y., Zhang, X., Jiang, R., Liu, M., Liu, L. and Chen, L., 2021. *Identification of potent human neutralizing antibodies against SARS-CoV-2*

implications for development of therapeutics and prophylactics. Nature communications, 12(1), pp.1-11.

CHAPTER 8: APPENDICES

UNIVERSITY OF LUSAKA

SCHOOL OF MEDICINE AND HEALTH SCIENCES

FACTORS AFFECTING COVID-19 VACCINE UPTAKE AMONG ART PATIENTS: A CROSS SECTIONAL STUDY AT KAPATA URBAN CLINIC IN CHIPATA DISTRICT, EASTERN PROVINCE

My name is **PHIRI LENIA,** an MPH student at University of Lusaka.

I am carrying out a study seeks to explore factors affecting the vaccine uptake among ART patients at Kapata Urban Clinic in Chipata District, Eastern Province between April 2021 and December 2022.

Your participation is voluntary and you may pull out at any time if you wish. There are no risks associated with your participation in the study. You are under no obligation to participate in the study and refusal to participate will not affect you in anyway. All data will be kept in a safe place and will not be shared with anybody and will not be used for any other purposes apart from the study. You are free to ask any questions about the study at any time if you need more clarification.

I, _____ have had the study explained to me. I have understood all that has been written and had my questions answered satisfactorily. I understand that I can change my mind at any stage and it will not affect the benefits due to me.

Data collection tools

UNIVERSITY OF LUSAKA

SCHOOL OF MEDICINE AND HEALTH SCIENCES

FACTORS AFFECTING COVID-19 VACCINE UPTAKE AMONG ART PATIENTS: A CROSS SECTIONAL STUDY AT KAPATA URBAN CLINIC IN CHIPATA DISTRICT, EASTERN PROVINCE

	YES	NO
PARTICIPATING IN THIS STUDY		
This research study has been explained to me, including that give will only be used for academic purposes and be treated with maximum confidentiality.		
I agree to take part in the study. Taking part in the study will include administered questionnaire and being interviewed and/or recorded (audio). I understand that I may with draw from the study at any time.		
USE OF THE INFORMATION PROVIDED		
I am in agreement that data collected from me may be stored for only academic purposes as described above.		
I am in agreement that data generated may be made available		
I agree that some or all the data I provide maybe shared with the supervisor according to the processes and procedures of this study by using codes or another code that de-identifies my data (or preserves the confidentiality of the information provided).		

Participants signature/mark/thumbprint date (dd/mm/yyyy)

If the participant is illiterate a witness should sign on the participant's behalf.

Declaration of witness: *I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.*

Participants signature/mark/thumbprint date (dd/mm/yyyy)

Declaration by the researcher: *I have given a verbal explanation of the research study; its procedures and I believe that the participant has understood that explanation.*

QUESTIONNAIRE: PATIENTS

SCHOOL OF MEDICINE AND HEALTH SCIENCES

FACTORS AFFECTING COVID-19 VACCINE UPTAKE AMONG ART PATIENTS: A CROSS SECTIONAL STUDY AT KAPATA URBAN CLINIC IN CHIPATA DISTRICT, EASTERN PROVINCE

Dear respondents,

My name is **LENIA PHIRI** a student at the University of Lusaka. I am conducting a research on factors affecting covid-19 vaccine uptake among art patients. You have been purposively selected to participate in this research as a research participant. Be advised that the research is purely an academic exercise and the information you are requested to give will only be used for academic purposes and be treated with maximum confidentiality.

Yours faithfully STUDENT/ RESEARCHER (**LENIA PHIRI**)

INSTRUCTIONS

1) Be sincere in your answering by being honest and truthful at all times.

2) In total there are 15 questions in this interview guide.

3) Where you are not clear seek clarity from the researcher.

	Demographic Data		
1	Age		
		a) 12-18	
		b) 9-34	
		c) 35 +	
2	Sex		
		a) Male	
		b) Female	
3	Occupation		
		a) Self employed	
		b) Formal employment	
		c) Student	
		d) Unemployed	
4	Marital Status		
		a) Married	
		b) Single	
		c) Divorced/Separated	
		d) Widowed	
To determine the proportion of people living with HIV currently on treatment and eligible for COVID-19 vaccination at Kapata Urban Clinic.			
5	What is your current HIV status? (Tick all that apply)		
		a) Positive and on treatment	
		b) Positive but not on treatment	
		c) Negative	
		d) I don't know	
6	Are you currently taking HIV treatment?		

		a) Yes, I am taking antiretroviral therapy (ART)

		b) No, I am not taking any HIV treatment	
		c) I don't know	
7	Have you been diagnosed with COVID-19?		
		a) Yes, I have been diagnosed with COVID-19	
		b) No, I have not been diagnosed with COVID-19	
		c) I don't know	
8	If you have not received any dose of the COVID-19 vaccine, why not?		
		a) I am not eligible for the vaccine	
		b) I am afraid of side effects	
		c) I do not believe in the vaccine's effectiveness	
		d) I am unable to access the vaccine	
		e) Other (specify)	
To ascertain the rate of COVID-19 vaccine uptake at Kapata Urban Clinic			
9	Have you received any information about COVID-19 vaccination from the clinic?		
		a) Yes	
		b) No	
		c) I don't remember	
10	Have you faced any challenges in accessing COVID-19 vaccination?		
		a) Yes, I faced challenges in accessing COVID-19 vaccination	
		b) No, I did not face any challenges in accessing COVID-19 vaccination	
		c) I don’t know	

11	Would you encourage your family, friends or colleagues to get vaccinated against COVID-19?		
		a) Yes, I would encourage them to get vaccinated against COVID-19	
		b) No, I would not encourage them to get vaccinated against COVID-19	
To explore the factors affecting COVID-19 vaccine uptake at Kapata Urban Clinic.			
12	How did you learn about the COVID-19 vaccine?		
		a) TV commercials	
		b) Radio commercials	
		c) Social media	
		d) Healthcare provider	
		e) Family or friends	
		f) Other (please specify)	
13	On a scale of 1 to 5, how confident are you in the safety and effectiveness of the COVID-19 vaccine?		
		a) 1 - Not at all confident	
		b) 2 - Slightly confident	
		c) 3 - Moderately confident	
		d) 4 - Very confident	
		e) 5 - Extremely confident	
14	Have you experienced any side effects after receiving the COVID-19 vaccine?		
		a) Yes	
		b) No	
15	If you have experienced side effects after receiving the COVID-19 vaccine, what were they?		
		a) Pain at the injection site	
		b) Fatigue	

		c) Headache	
		d) Muscle aches	
		e) Chills	
		f) Fever	
		g) None of the above	
		h) Others (Specify)	

INTERVIEW GUIDE: STAFF MEMBERS AT KAPATA URBAN CLINIC

UNIVERSITY OF LUSAKA

SCHOOL OF MEDICINE AND HEALTH SCIENCES

FACTORS AFFECTING COVID-19 VACCINE UPTAKE AMONG ART PATIENTS: A CROSS SECTIONAL STUDY AT KAPATA URBAN CLINIC IN CHIPATA DISTRICT, EASTERN PROVINCE

Dear respondents,

My name is **LENIA PHIRI** a student at the University of Lusaka. I am conducting research on factors affecting covid-19 vaccine uptake among art patients. You have been purposively selected to participate in this research as a research participant. Be advised that the research is purely an academic exercise and the information you are requested to give will only be used for academic purposes and be treated with maximum confidentiality.

Yours faithfully STUDENT/ RESEARCHER (**LENIA PHIRI**)

INSTRUCTIONS

1) Be sincere in your answering by being honest and truthful at all times.

2) In total there are 13 questions in this interview guide.

3) Where you are not clear seek clarity from the researcher.

SECTION A: DEMOGRAPHIC DATA

1. Sex?

2. What is your position at work?

3. How long have you worked at this hospital?

SECTION B:

TO DETERMINE THE PROPORTION OF PEOPLE LIVING WITH HIV CURRENTLY ON TREATMENT AND ELIGIBLE FOR COVID-19 VACCINATION AT KAPATA URBAN CLINIC

4. What are the current practices and protocols in place for identifying people living with HIV who are eligible for COVID-19 vaccination at Kapata Urban Clinic?.....
.....
.....

5. What are the attitudes and beliefs of healthcare providers at Kapata Urban Clinic regarding COVID-19 vaccination among people living with HIV, and how do these impact their willingness to recommend the vaccine to their patients?

.....

.....

6. What are the experiences and perceptions of healthcare providers at Kapata Urban Clinic who have already administered COVID-19 vaccines to people living with HIV?

.....

.....

TO ASCERTAIN THE RATE OF COVID-19 VACCINE UPTAKE AT KAPATA URBAN CLINIC.

7. How does communication between healthcare providers and people living with HIV impact the uptake of COVID-19 vaccination at Kapata Urban Clinic?

.....

.....

.....

8. How does the availability of resources such as vaccines, trained staff, and equipment impact the ability of Kapata Urban Clinic to provide COVID-19 vaccination to people living with HIV?

.....

.....

.....

TO EXPLORE THE FACTORS AFFECTING COVID-19 VACCINE UPTAKE AT KAPATA URBAN CLINIC

9. What factors are contributing to the rate of COVID-19 vaccine uptake at Kapata Urban Clinic, according to healthcare providers?

.....

.....

.....

10. How do demographic factors such as age, gender, and occupation influence the willingness of patients to receive the COVID-19 vaccine at Kapata Urban Clinic?

.....

.....

.....

11. How do socio-cultural and religious beliefs impact the willingness of patients to receive the COVID-19 vaccine at Kapata Urban Clinic, and how are healthcare providers addressing these beliefs in their communication and outreach efforts?

.....

.....

.....

12. What are the potential barriers to the uptake of COVID-19 vaccination among people living with HIV at Kapata Urban Clinic, and how can these be addressed?

.....

.....

.....

13. What are the potential sources of support and resources that could be provided to Kapata Urban Clinic to improve the implementation of COVID-19 vaccination among people living with HIV?

.....

.....

.....

Thank you for your cooperation.