

Intersecting Epidemics: The implications of COVID-19 in the utilisation of HIV treatment services among people living with HIV on antiretroviral treatment (ART) in Zimbabwe

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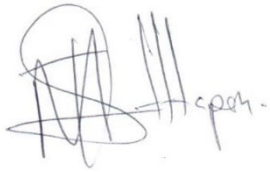
A thesis submitted to the Faculty of Humanities, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the award of the degree of Doctor of Philosophy in Demography and Population Studies

Johannesburg, 2023

DECLARATION

I, Talent Tapera, declare that this thesis is my own original work. This thesis is being submitted for the degree of Doctor of Philosophy in Demography and Population Studies, Schools of Social Sciences and Public Health, Faculty of Humanities of the University of the Witwatersrand, Johannesburg. It has not been submitted before in part or in full for any degree or examination at this or any other university.

Signed:

A handwritten signature in blue ink, appearing to read 'Talent Tapera', with a large circular flourish on the left side.

Dated: 12th day of December, 2023

DEDICATION

To my wife Faith, my daughter Tinotenda, my son Ethan, my parents, my siblings Parie and Sharon.

ACKNOWLEDGEMENTS

I would like to thank the Almighty God for guiding me through the conception, up to the completion of this PhD research undertaking. I return all the glory to the Almighty God. This piece of work relied on the mentorship of my supervisor, Professor Clifford Odimegwu. I am immensely grateful for the tutelage from Prof. Odimegwu. I would also want to appreciate my local advisor for the study, Dr. Pugie Chimberengwa. This research work was done by utilising the platforms of Zimbabwe Networking for People living with HIV (ZNNP+) and Zvandiri. I appreciate the dedication and support provided by Waraidzo Mukuwapasi and Gilton Kadziyanike from ZNNP+. More so, I would want to appreciate the dedication and support of Vivian Chitiyo, Abigail Mustinze, Mather Mawodzeke from Zvandiri. The efforts of these five were pivotal in ensuring the data collection process went smoothly and as planned.

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AOR	Adjusted Odds Ratio
ART	Antiretroviral Therapy
CATS	Community Adolescent Treatment Supporters
CHAs	Community Health Agents
COVID-19	Coronavirus Disease of 2019
GSEM	Generalized structural equation modeling
HIV	Human Immunodeficiency Virus
MOHCC	Ministry of Health and Child Care
MRCZ	Medical Research Council of Zimbabwe
PEPFAR	United States President’s Emergency Plan for AIDS Relief
PreP	Preexposure Prophylaxis
SSA	Sub-Saharan Africa
SRH	Sexual and Reproductive Health
STI	Sexually Transmitted Infections
TB	Tuberculosis
TPT	Tuberculosis Preventative Therapy
UNAIDS	United Nations Programme on HIV/AIDS
WHO	World Health Organization
ZIMSTAT	Zimbabwe National Statistics Agency
ZNNP+	Zimbabwe Networking for People living with HIV

EXECUTIVE SUMMARY

Title: Intersecting Epidemics: The implications of COVID-19 in the utilisation of HIV treatment services among people living with HIV on antiretroviral treatment (ART) in Zimbabwe

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Supervisor: Professor Clifford Odimegwu

Introduction

Zimbabwe has been working towards the last mile of controlling the Human Immunodeficiency Virus (HIV) epidemic where keeping people that are living with HIV on antiretroviral therapy (ART) is primarily important. Ensuring they are virally suppressed and can thwart opportunistic infections is key. The advent of COVID-19 potentially posed a threat of derailing or reversing the gains attained in the fight against HIV. Zimbabwe has more than one million people living with HIV (United Nations Programme on HIV and AIDS [UNAIDS], 2020). Since the coming of the COVID-19 pandemic the country has recorded more than 260 000 cases of COVID-19 (Ministry of Health and Child Care [MOHCC], 2023). The question of whether the COVID-19 pandemic intensified barriers and redefined the utilisation of HIV treatment services by people who are living with HIV on ART in Zimbabwe has remained largely unanswered in the literature currently available. Thus, the main purpose of this research was to examine the implications of COVID-19

in the utilisation of HIV care treatment services among people who are living with HIV on ART in Zimbabwe and the factors associated with it.

This study defined, the utilisation of HIV treatment services as accessing and taking up a package of services expected to be received by people who are living with HIV on ART such as scheduled ART drug refill collections, viral load monitoring, Tuberculosis (TB) preventative therapy and TB screening. In addition, the study investigated the predisposition of people who are living with HIV in using the COVID-19 vaccine and the reasons behind not getting vaccinated.

Theoretical Framework

The study was anchored in the fifth revision of the Andersen behavioural model of healthcare utilisation. This model argues that the use of health services is based on three factors classified as (1) predisposing, (2) enabling and (3) need factors. The model defines predisposing factors as usually demographic and socio-cultural characteristics. These pre-exist before accessing health services. Predisposing factors include age, sex, education and religion. Enabling factors are logistical aspects or means and resources of accessing health services such as distance and cost. Need factors are immediate and important reasons for utilisation of health services such as illness and pregnancy. The fifth model version of the model allowed the addition of environmental factors. The dependent variable was the utilisation of HIV treatment services and also COVID-19 vaccination among people living with HIV. As such, it was critical to anchor the study in this framework as it sought to identify the critical factors of utilisation of HIV treatment services and COVID-19 vaccination among people living with HIV. Therefore, following the Anderson model, the predisposing factors for this study were age, sex, marriage, religion, education and COVID-19 vaccination. The enabling factors were COVID-19 lockdown restrictions, COVID-19 transport

stoppages, distance to a health facility, transport cost to a health facility, fear of contracting COVID-19, non-availability of community healthcare services, and COVID-19 related stigma among healthcare workers. The need factors were opportunistic infection during the COVID-19 period, COVID-19 infection, and contact with a COVID-19 case, while environmental factors were residence and type of health facility.

Study Hypotheses

The study hypotheses were chosen based on the logic of the Anderson model factors. The first hypothesis tested if predisposing factors (age, sex, marriage, religion, education, COVID-19 vaccination) are associated with a higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe. This hypothesis was chosen as pre-existing demographic socio-cultural characteristics are important in defining utilisation of HIV services. The second hypothesis tested if enabling factors (COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services, COVID-19 related stigma among health care workers) are associated with a higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe. This hypothesis was chosen as the logistical aspects in accessing services are important in pushing for or against accessing a health service. The third hypothesis tested if need factors (pregnancy during the COVID-19 period, opportunistic infection during the COVID-19 period, COVID-19 infection, contact with a COVID-19 case) are associated with a higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe. This hypothesis was chosen as the immediate

causes of health service use are important and needed to be tested in this study. Finally, the study tested if environmental factors (residence and type of health facility) are associated with a higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe. This hypothesis was chosen as public health concerns like COVID-19 thrive and have different impacts in different environments and settings.

Methodology

The study used a concurrent triangulation design in which there was only one data collection phase. The quantitative data was collected from people who are living with HIV on ART through a structured interviewer-administered questionnaire. The quantitative questionnaire asked about all the predisposing, enabling, need and environmental factors as they related to accessing or not accessing the expected HIV treatment services per each sample person living with HIV on ART. The questionnaire also asked about COVID-19 vaccination among people living with HIV and the reasons for not getting vaccinated. The questionnaire was administered to adolescents and young people (15–24) by Community Adolescent Treatment Supporters (CATS) from Zvandiri, while data for adults (25+) was administered by Community Health Agents (CHAs) from Zimbabwe National Network of People Living with HIV (ZNNP+). A total of 2 157 people living with HIV were sampled for the study of which 791 were adolescents and young people (15–24) and 1 366 were adults (25+). On the qualitative data collection modality, qualitative data collection was collected through in-depth interviews with purposively sampled key stakeholders such as 24 HIV community volunteers, six district HIV focal persons and six health promotion officers.

Statistical analysis was performed using STATA with a 5% level of significance. Frequency distributions and Chi-square test of association were used at the univariate and bivariate levels of

analysis. Multivariate binary logistic regression was used to identify the predictors of utilising HIV treatment services. All quantitative analyses were conducted at $\alpha=0.05$. Adjusted odds ratios (AOR) with corresponding p-values were reported. All covariates from the bivariate analysis were included in the multivariate analysis regardless of their significance. The multivariate analysis was done on eight models. Model 1 had predisposing factors, Model 2 had enabling factors, Model 3 had need factors and Model 4, environmental factors. Model 5 had predisposing and enabling factors and Model 6 had predisposing and need factors. Model 7 had predisposing and environmental factors and Model 8 had the full model with predisposing, enabling, need and environmental factors. Thematic analysis was used to analyse the qualitative data to explain the factors responsible for the utilisation of HIV treatment services in Zimbabwe. Qualitative analysis was conducted using NVIVO version 12.

Key Findings by Objective

Objective 1: To examine the effect of the COVID-19 outbreak on the utilisation of HIV treatment services in Zimbabwe since the outbreak

The study found that TB screening services had relatively lower utilisation of 83% and above and below 90% for TB preventative therapy across all predisposing, need and environmental factors. COVID-19 lockdown restrictions were noted as the major reason for not utilising ART drug refills, viral load monitoring, TB preventative therapy and TB screening among people living with HIV. The reason for this was explained in qualitative interviews as a function of being in an emergency mode during the COVID-19 period, whereby people living with HIV had to prioritise the services that they deemed most important. The ART drug refills became the most important and they would not prioritise getting TB screening or getting their TB preventative therapy course. Secondly,

among the community volunteer in-depth interviews this was explained as a barrier as TB symptoms were similar to COVID-19 symptoms. Hence, there was some level of stigma towards offering services such as TB screening. It was noted that it was difficult for people living with HIV outside Zimbabwe who access their ART in Zimbabwe in usually 6 monthly periods. This was so due to closure of borders and restrictions on movements.

On ART drug refills, distance to the health facility contributed 11% of the reason for HIV non-utilisation as it was the second main reason after COVID-19 restrictions. On viral load monitoring, COVID-19 transport stoppages (11%) and fear of contracting COVID-19 (11%) were the second main reasons after COVID-19 restrictions. On TB preventative therapy, fear of contracting COVID-19 (17%) and non-availability of community health workers in COVID-19 restrictions (7%) were the second and third main reasons after COVID-19 restrictions respectively. On TB screening, fear of contracting COVID-19 (19%) was the second main reason after COVID-19 restrictions.

Objective 2: To explore the predictors of continued utilisation of HIV treatment services since the COVID-19 outbreak among people who are living with HIV on ART in Zimbabwe.

For predisposing factors, regarding bivariate associations, age was statistically significant for utilisation of ART drug refills, viral load, TB preventative therapy and TB screening services among people living with HIV. Religion was also statistically significant for the utilisation of ART drug refills, viral load, TB preventative therapy and TB screening. Education was statistically significant for the utilisation of ART drug refills, viral load and TB screening. Being vaccinated for COVID-19 was also statistically significant for accessing ART drug refills, viral load, TB preventative therapy and TB screening services among the people living with HIV. However,

marriage and sex were not significantly associated with the utilisation of HIV services after the advent of COVID-19.

Regarding multivariate associations on predisposing factors, the utilisation of ART drug refill services was significantly associated with ages 15–24, 35–44, 45+, being adult male aged 25+ on comparison between adolescents and young people and adults and being Pentecostal/Protestant. On utilisation of viral load monitoring services, ages 15–24, 35–44, 45+, being adult male 25+ on comparison between adolescents and young people and adults, being Roman Catholic and being vaccinated were significantly associated. On utilisation of TB preventative therapy ages 15–24, 35–44, 45+, being adult male 25+ on comparison between adolescents and young people and adults, being unmarried, and being vaccinated for COVID-19 were significantly associated. On TB screening services, ages 15–24 and 35–44, being unmarried, being in other religions and being vaccinated were significantly associated.

Regarding enabling factors, distance to health facility was statistically significant to utilisation of ART drug refills among adults aged 25+. Transport cost to health facility was statistically significant to utilisation of ART drug refills as well. Fear of contracting COVID-19 was statistically significant across utilisation of ART drug refills, viral load monitoring, TB preventative therapy and TB screening. Non-availability of community health services was statistically significant for accessing viral load services among adults aged 25+ and also for TB preventative therapy. Regarding need factors, having an opportunistic infection in the COVID-19 restriction periods was significantly associated with higher odds of accessing viral load monitoring and also TB screening. Regarding environmental factors, residence and type of health facility were statistically significant at bivariate analysis and also in the HIV services at multivariate analysis.

Objective 3: To assess the differences in the predictors of utilisation of HIV treatment since the COVID-19 outbreak between adolescents and young people (15–24) on ART and adults 25 years and older on ART.

Among people who are living with HIV (n=2 157), the study noted a higher proportion of utilisation of ART drug refills among adults 25+ which was 94% (1283/1366) in comparison to adolescents and young people which was 91% (727/791). The study also found a lower proportion of utilisation of TB preventative therapy among adults which was 83% (1134/1366) in comparison to adolescents and young people which was 90% (709/791). Regarding predisposing factors, among adults, being male was significantly associated with lesser odds of ART drug refill utilisation in comparison with females. This was however not significant in adolescents and young people. Regarding need factors, adults who had an opportunistic infection was significantly associated with higher odds of viral load monitoring among people living with HIV. However, among adolescents and young people there was no significant association. Regarding environmental factors, adults residing in a rural area was significantly associated with higher odds of viral load monitoring among people living with HIV in comparison with their urban counterparts. However, among adolescents and young people there was no significant association.

Objective 4: To investigate the predisposition of people on ART to utilise the COVID-19 vaccine and factors that influence their decision.

Eighty-six percent of the study participants who are living with HIV had been vaccinated for COVID-19. Among people who are living with HIV who were vaccinated (n=1 851), the study found a higher proportion of utilisation of COVID-19 among adults 25+ which was 91% (1249/1366) in comparison to adolescents and young people which was 76% (602/791). In-depth

interviews also showed that the severity of COVID-19 in older age bands also led to COVID-19 vaccine messaging being more targeted towards the older age bands. Qualitative thematic analysis of text comments from in-depth interviews revealed that COVID-19 vaccination messaging was mostly targeted at the older age bands, hence this outcome.

Fear of side effects contributed to the main (48%) reason for not getting vaccinated among the study participants. This was followed by religious reasons (22%) and then being unsure if people living with HIV should get vaccinated (15%). Regarding predisposing factors, age 15–24 was significantly associated with less likelihood of getting the COVID-19 vaccination in comparison with their 25–34 counterparts. Older ages, age 35–44 and age 45+ were associated with higher odds of COVID-19 vaccination among people who are living with HIV in comparison with the 20–24 age group. People living with HIV in which primary level education was their highest level was significantly associated with less likelihood of getting COVID-19 vaccination in comparison with their secondary level counterparts. Regarding need factors, being a previous contact of a COVID-19 case was significantly associated with higher odds of COVID-19 vaccination in comparison with not getting vaccinated. Regarding environmental factors, being in a rural area was significantly associated with higher odds of COVID-19 vaccination among people living with HIV in comparison with their urban counterparts.

Hypothesis Test Results and Relevance of Theoretical Model

The first hypothesis was accepted showing that predisposing factors were critical in defining the utilisation of HIV services during the advent of COVID-19. The fourth hypothesis test results were

also accepted showing that environmental factors were also critical in defining the utilisation of HIV services during the COVID-19 pandemic. However, the second hypothesis was rejected as multivariate analysis showed no significance among the enabling factors. However, of the enabling factors, COVID-19 lockdown restriction was the major reason for non-utilisation of HIV services among people living with HIV during the COVID-19 pandemic. The third hypothesis on need factors was also rejected. However, the fear of contracting COVID-19 as a need factor was significant in multivariate analysis for ART drug refills, viral load monitoring, TB preventative therapy and TB screening. The hypothesis test results showed that the Anderson health model is relevant in conceptualizing health utilisation. Although enabling and need factors had rejected hypotheses, they still had factors that were significant although not the majority. In this regard, it is critical to use the Anderson model of factors when implementing public health projects necessary to improving utilisation of health services.

Conclusions

The research findings managed to answer the research question: Is/did the COVID-19 pandemic intensify barriers and redefine the utilisation of HIV treatment services among people living with HIV on antiretroviral viral therapy (ART) in Zimbabwe? First, the study ascertained that COVID-19 intensified barriers to accessing HIV services as COVID-19 lockdown restrictions was the major reason among people living with HIV who missed their ART drug refills, viral load monitoring, TB preventative therapy and TB screening. Second, the factors associated with utilisation of HIV services showed that there was redefinition of significant factors as utilisation was better in rural areas than urban areas regardless of rural barriers such as distance. The urban settings, which were hard hit by COVID-19, presented many more barriers than urban areas. In

addition, factors such as the fear of COVID-19 became significant factors with regard to utilisation of HIV services.

This study of the utilisation of HIV services after the advent of COVID-19 makes three knowledge contributions to the research literature. Firstly, previous studies on barriers of HIV services access during the COVID-19 pandemic largely focused on documenting the effects of COVID-19 (Assefa et al., 2021; Dear et al., 2021; Lagat et al., 2020; Lungu et al., 2022; Pierre et al., 2020; Umviligihozo et al., 2020). This study provides an understanding of how predisposing, need, environmental and enabling factors are associated with defining the utilisation of HIV services during the COVID-19 period in Zimbabwe. Second, the study provided reasons from the people living with HIV on what factors were barriers to them accessing HIV services after the advent of COVID-19. Third, the study contributes to the limited knowledge in the literature about COVID-19 vaccination among people living with HIV, specifically as it relates to disparities among adolescents and young people (15–24) and adults (25+).

Implications of Findings

The results of the multivariate regression analysis showed higher odds of accessing HIV services among people living with HIV among older age bands as compared to adolescents aged 15–19 during the COVID-19 pandemic. This finding raises an important public health concern that to achieve HIV epidemic control, there is a need to prioritise interventions for adolescents and young people living with HIV. There is thus a need to always keep utilisation of health services in this age group in check.

The study found a lower proportion of utilisation of COVID-19 vaccination among adolescents and young people which was 24% (189) in comparison to adults which was 9% (117). A few studies have also found younger adults COVID-19 vaccine acceptance being low (Malik et al., 2020; Mundagowa et al., 2022 Nguyen et al., 2021). In-depth interviews showed that this was noted as a result of the COVID-19 messaging which targeted older age bands since COVID-19 was more severe in these age bands. This calls for the need to deliberately target the younger age bands living with HIV with vaccine information to improve uptake across all sub-populations. In-depth interviews consistently brought up that adolescents rely on caregivers for decision making such as COVID-19 vaccination. I recommend the targeting of families, communities and healthcare workers to ensure adolescent and youth-friendly information and support for caregivers that includes information and support for vaccinations.

Frontiers for Further Research

Future studies may be conducted to evaluate the effectiveness of interventions implemented during the COVID-19 pandemic in terms of guaranteeing the utilisation of HIV services. There is also a need to keep researching the effectiveness of COVID-19 vaccination promotion activities among people living with HIV. In addition, there is a need to combine mental health services and HIV in utilisation discourse in further studies.

CHAPTER ONE: INTRODUCTION

1.1 Background of Study

The World Health Organization (WHO) declared, the Coronavirus disease (COVID-19) a global pandemic on the 11th of March 2020 (Cucinotta & Vanelli, 2020). Governments worldwide initiated a multitude of initiatives to control the spread of COVID-19 in communities but these had unintended and unwanted repercussions for society; health care was one such activity that was negatively affected. Lockdowns resulted in severe cutbacks in economic activity, job losses, closure of manufacturing plants and stoppages placed on imports and exports which resulted in a shortage of medical equipment, products and stock-outs on vital medication in clinics. Questions arose on the impact of COVID-19 on what was an already ailing health system especially in developing countries, including those in sub-Saharan Africa (SSA). The coming in of COVID-19 to intersect with HIV brought fears of derailment the progress in fight against HIV/AIDS.

Regarding the HIV, globally, there have been considerable achievements in HIV treatment and Acquired Immunodeficiency Syndrome (AIDS)-related deaths have been reduced by 60% since the peak in 2004 (UNAIDS, 2020). The virus has been in the world for close on 40 years and there is now a greater need to embark on the last mile of epidemic control where new infections fall below the deaths HIV. This is reflected by the United Nation's commitment to end the HIV epidemic by the year 2030 (United Nations General Assembly, 2016). In the fight against epidemic control there is a need to ensure that all people who are living with HIV can access treatment services to guarantee a holistic reduction of HIV morbidity, mortality and new infections as well

as through suppressed viral loads which make HIV non-transmissible. Potentially the efforts against the HIV epidemic may be more difficult with the outbreak of COVID-19. Zimbabwe has an HIV prevalence of 12.9% among adults (ZIMPHIA, 2020). Regarding the achievement of the UNAIDS 90-90-90 targets, 86.8% of adults living with HIV had knowledge of their HIV status. Regarding the second 90, of those aware of their status, 97.% were on ART. Among those on ART, 90.3% were virally suppressed. Regarding COVID-19 between January 2020 and November 2023, the country has recorded 265,848 confirmed cases of COVID-19 with 5,723 deaths.(WHO, 2023). A national lockdown was introduced in Zimbabwe as of the 30th March 2020 (MOHCC, 2023) to curtail the spread of COVID-19. Thus, this study examined the implications of COVID-19 in the utilisation of HIV care treatment services for people who are living with HIV on ART in Zimbabwe. The study aimed to identify the critical factors defining the utilisation of HIV treatment services in the advent of COVID-19. The study also took the opportunity to explore vaccine hesitancy among people who are living with HIV and the reasons behind it.

1.2 Problem Statement

COVID-19 had a toll on the utilisation of broader sexual and reproductive health services (SRH). The supply chain for health commodities such as contraceptives had been affected causing delays in shipments (Purdy, 2020). Service providers of SRH services were reported to have switched focus to COVID-19 services and health facilities shut down due to staff COVID-19 isolations. In addition, people were reluctant to seek SRH services in the face of COVID-19 (Riley et al., 2020). Countries turned to instituting restrictions on movement as a public health measure to curtail the spread of COVID-19. Hence, sexual reproductive health providers in some instances were forced to shut down their services and concentrate on essential emergency services (Riley et al., 2020).

In South Africa, Govender et al. (2020) exposed how broader SRH services became collateral damage as attention was diverted to COVID-19. In Sierra Leone, diversion happened during Ebola, as sexual reproductive services were reduced (Lokot & Avakyan, 2020). As such, the consequences of COVID-19 should not be overlooked in the need to ensure people living with HIV keep accessing expected care and treatment services.

Regarding the response to HIV, the formulation of antiretroviral therapy (ART) has saved many lives. It turned HIV from being a terminal disease for people who are living with HIV globally. Antiretroviral therapy (ART) is a lifelong drug and there is a need to ensure that people who are living with HIV stay on the treatment and can access the expected services to prevent and treat opportunistic infections. Expected HIV treatment services for eligible patients include routinely receiving the ART drug refill, viral load monitoring, Tuberculosis (TB) preventative therapy and TB screening and treatment among others. The maximum use of these HIV treatment services is critical in ensuring that people living with HIV maintain healthy lives and reducing HIV morbidity, mortality and new infections where the viral load of people living with HIV is suppressed. Several barriers to the utilisation of HIV services by people living with HIV pre-existed before the advent of COVID-19; these were potentially intensified and/or new barriers arose due to COVID-19. There was thus a great need to see how the outbreak of COVID-19 intensified or redefined health care utilisation of HIV treatment services which are lifelong and are essential needs for the healthy living of people with HIV. There was a need to conduct a study to check if the gains towards reaching epidemic control of HIV were threatened by the outbreak of COVID-19 which this study aimed to contribute to in Zimbabwe.

Globally, more than 37 million people are living with HIV. Of these, more than 27 million people who are living with HIV were accessing antiretroviral therapy as of 2020. Of these, sub-Saharan Africa is home to two-thirds (67%) of the people living with HIV (UNAIDS, 2020). Zimbabwe has a generalised HIV epidemic and is home to more than one million people living with HIV (UNAIDS, 2020). The country has an HIV prevalence of 12.9% among adults (ZIMPHIA, 2020). Zimbabwe is still yet to ramp up its efforts to reach HIV epidemic control with a significant population of people on ART not utilising all HIV treatment services such as viral load monitoring which has coverage of less than 50% nationally. In a study to ascertain the barriers to HIV service utilisation by people living with HIV, it was found that participants related that community-related barriers and health system barriers were critical in impeding their utilisation (Tafuma et al., 2018). In another study that sought to understand the predictors of retention in HIV treatment, it was found that age and the WHO stages were important factors (Makurumidze et al., 2020). The advent of COVID-19 meant that a knowledge gap emerged on how the barriers and predictors of utilising HIV treatment have intensified or have redefined the utilisation of the services.

There were fears that people who are living with HIV may experience severe COVID-19 outcomes than HIV-negative people (UNAIDS, 2020). More so, a study carried in the United Kingdom found that people who are living with HIV seemed to have a higher risk of dying due to COVID-19 (Bhaskaran et al., 2021). Therefore, this highlighted that there was a need to ensure that people who are living with HIV used their HIV treatment services including the COVID-19 vaccination. In a study in South Africa, which aimed at assessing the effects of COVID-19 lockdowns on HIV treatment, it was found that testing of HIV and subsequent initiation on ART for those that tested positive was affected (Dorward et al., 2021). The study did not however go on to explore the

critical factors associated with the utilisation of the ART services which this study did. Thus, there was a need to investigate the factors that are associated with the utilisation of HIV treatment services and compare if there were any differences in access between adolescents and young people in comparison to adults after the advent of COVID-19.

Since the coming in of COVID-19, Zimbabwe had recorded over 260 000 cases. A national lockdown was introduced on the 30th March 2020 (MOHCC, 2023). Another nationwide lockdown was initiated after the festive season in January 2021 and for the greater part of 2022. Despite limitations in human movements, the lockdown restrictions resulted in stoppages of services regarded as non-emergency services. More so, there were disruptions in the supply chains of consumables for medical care (Murewanhema & Makurumidze, 2020).

COVID-19 disruptions could potentially add to the bucket of reasons that restrict access of HIV treatment services among people living with HIV. This could through transport challenges, shortage of service providers due to COVID-19 among others. The study thus, sought to expand the frontiers of knowledge and further debate on the intersections of the two epidemics which are Covid19 and HIV. There is a risk that if this is not well researched and the implications addressed, there may be a decrease in the traction that has been gained in fighting HIV through the outbreak of COVID-19. The question “Is/did the COVID-19 pandemic intensify barriers and redefine the utilisation of HIV treatment services for people who are living with HIV on ART in Zimbabwe?” remains unanswered in available literature particularly because COVID-19 is novel and a relatively new challenge to public health. Thus, I explored the predictors of utilising HIV treatment services in the advent of COVID-19. In doing so I also intended to compare if there are differences between adolescents, young people, and adults in the utilisation of these services after the advent

of COVID-19. Lastly, I intended to also confirm if there is COVID-19 vaccine hesitancy among people who are living with HIV and the reasons behind it.

1.3 The Purpose Statement

The purpose of this study was to examine the impact of COVID-19 pandemic on the utilisation of HIV treatment services among people who are living with HIV on ART and the factors associated with it in Zimbabwe. The study used a concurrent triangulation design of which only one data collection phase was used. The quantitative data was collected from people who are living with HIV on ART through a structured questionnaire. On the other hand, qualitative data was collected through in-depth interviews with purposively sampled key stakeholders such as community HIV volunteers, district HIV focal persons and district health promotion officers. The study was anchored in the fifth revision of the Andersen Behavioural Model of Healthcare Utilisation. This model argues that the actual use of health care services is a function of three factors classified as predisposing, enabling and need factors which are particularly critical in defining access to HIV treatment services, particularly after the advent of COVID-19. The dependent variable is defined as the utilisation of HIV treatment services. The predisposing factors included age, sex, marriage, religion, education and COVID-19 vaccination. The enabling factors included COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services and COVID-19 related stigma among health care workers. The need factors included opportunistic infection during the COVID-19 period, COVID-19 infection and contact with COVID-19 case while environmental factors were residence (urban /rural) and type of health facility. More so, the

study went on to confirm if there was COVID-19 vaccine hesitancy among people who are living with HIV and the reasons behind it.

1.3.1 Research Question

The study's overarching research question is: Did the COVID-19 pandemic intensify barriers and redefine the utilisation of HIV treatment services for people who are living with HIV on ART in Zimbabwe?

1.3.2 General Objective

To examine the predictors that define the utilisation of HIV treatment services by people who are living with HIV on ART in Zimbabwe.

1.3.2.1 Specific objectives

1. To examine the effect of the COVID-19 outbreak on the utilisation of HIV treatment services in Zimbabwe since the outbreak.
2. To examine the predictors of continued utilisation of HIV treatment services since the COVID-19 outbreak among people who are living with HIV on ART in Zimbabwe.
3. To assess the differences in the predictors of the utilisation of HIV treatment since the COVID-19 outbreak between adolescents and young people (15–24) on ART and adults 25 years and older on ART.
4. To investigate the predisposition of people on ART to utilise the COVID-19 vaccine and factors that influence their decision.

1.6 Definitions and Delimitations

HIV treatment services: These include a package of services expected to be received by people living with HIV on ART, such as scheduled drug refill collection, viral load monitoring, Tuberculosis (TB) preventative therapy and TB screening and treatment.

Utilisation of services: Utilisation of services in this study are taken in the context of accessing and taking up HIV treatment services and the COVID-19 vaccination.

In terms of delimitation the study was confined to Zimbabwe.

1.7 Significance of the Study

Current research on HIV treatment services utilisation in the advent of COVID-19 is very limited. Public health practitioners are pushing towards attaining HIV epidemic control and need to ensure that all people living with HIV are diagnosed and put on and stay on lifelong treatment. Barriers and predictors of the utilisation of HIV treatment services have been previously researched in the pre-COVID-19 era (Makurumidze et al., 2020; Tafuma et al., 2018). However, literature on how the outbreak of COVID-19 intensified the barriers or brought up new barriers to the utilisation of HIV treatment services is lacking. Thus, this study will help contribute to filling this gap that has arisen due to the outbreak of the novel COVID-19 pandemic. Thus, by exploring the predisposing, enabling, need and environmental factors, the results from the study have the potential to increase knowledge on the extent to which COVID-19 has changed the course of HIV services utilisation.

More so, there is now more than ever a greater focus on the global effort to end the HIV/AIDS epidemic through achieving epidemic control. There is thus the need to ensure that there is access

of HIV treatment services by everyone in need of the service across ages, gender, religions and localities including those who are vulnerable. International organisations such as UNAIDS and the United States President's Emergency Plan for AIDS Relief (PEPFAR) have been supporting the implementation of strategies to fast-track epidemic control through reaching key populations among others. The Zimbabwe Ministry of Health and Child Care has affirmed its commitment to epidemic control in the country. It is thus imperative that the implications of COVID-19 on HIV treatment be investigated so as provide useful information on the HIV response as we get into the last mile of achieving epidemic control. Thus, it was envisioned that this study might provide insights that would guide the response to the two intersecting epidemics. It might also contribute to planning insights such as any other epidemic that may emerge in future.

Lokot and Avakyan (2020) noted that in developing countries that experience the challenges of poverty or inadequate health systems, low access to sexual reproductive health may be more apparent. Zimbabwe already faced a stretched healthcare system with healthcare worker strikes and the outbreak of COVID-19 posing as threats (Makoni, 2020). It is thus imperative to scientifically confirm if the enabling and environmental factors, such as availability of commodities, human resources for healthcare, among others, intensified after the advent of COVID-19 and particularly, whether they impacted the utilisation of HIV treatment services in Zimbabwe. Thus, this study needed to investigate the implications of COVID-19 on HIV treatment services use to come up with recommendations to improve healthcare use in the advent of outbreaks such as COVID-19. In addition, there has been no adequate studies that have been done documenting if there is vaccine hesitancy in Zimbabwe among people who are living with HIV. Because of the intensified risk of death among people living with HIV due to COVID-19, this

study was particularly critical in revealing if vaccine hesitancy is a challenge that should be prioritised among this group.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter reviews the related literature on COVID-19 and HIV intersections. The first part covers COVID-19 and HIV intersections and COVID-19 vaccine hesitancy from a global, sub-Saharan African and Zimbabwean view. Also presented in this segment is the current deficiencies in literature with regard to predictors of HIV service utilisation and also COVID-19 vaccination among people who are living with HIV. The following section discusses the Anderson health utilisation model and its application to this study. The last section presents the research hypotheses of the study.

2.2 Global Overview

Recent studies have documented the intensified risk among people who are living with HIV after contracting COVID-19. In a retrospective study in the United Kingdom, people who are living with HIV had a higher risk of death to COVID-19. In addition, the evidence suggested that this is particularly true among people who were Black (Bhaskaran et al., 2021). Systemic and meta-analyses on COVID-19 and HIV services have emerged over recent years. McClarty et al. (2021) reviewed the effect of the COVID-19 on key population groups at risk of HIV infection such as sex workers using case studies from Kenya, Ukraine and India. The review concluded that COVID-19-associated lockdowns had significantly interrupted sex work. This led to economic and health

challenges for sex workers that ranged from HIV-related services to mental health and increased vulnerability to violence. While studies produced in the recent past provide useful perspectives on COVID-19 and HIV, systematic analyses are needed for in-depth understanding of the dynamics between the two epidemics in sub-Saharan Africa. Therefore, to gain a deeper understanding of COVID-19 and HIV risks, service utilisation and vaccine hesitancy among people who are living with HIV, as part of the literature search of this study, a systematic review of peer-reviewed studies was undertaken to address this gap.

Studies done in the United States of America have revealed the negative impacts of the COVID-19 on HIV services (Meyer et al., 2023). More so, the studies document a notable decrease in HIV clinic visits after the advent of COVID-19 (Fadul et al., 2021; Gwadz et al., 2021; Kalichman et al., 2020, 2021; Tamargo et al., 2021). A global decrease in the number of new TB cases was identified was recorded during the COVID-19 restrictions periods (MacLean et al., 2022; Ruhwald et al., 2022) with HIV and TB commodities being rife. Therefore, there is need to confirm if this is also having an effect on people living with HIV in this study. Moreso, in the United Kingdom, age was found to be linked to lower levels of COVID-19 vaccine hesitancy (Cook et al., 2022). In Hong Kong, regarding COVID-19 vaccination acceptance rate was higher in adults aged 18 to 24 years which increased with age.

2.3 Africa

2.3.1 COVID-19 effects on HIV testing in Africa

Testing for HIV presents an entry point to ensuring that all people who are living with HIV are put on lifelong ART and live healthier lives. However, HIV testing services have been among the

services mostly impacted by COVID-19 especially in sub-Saharan Africa (Lagat et al., 2020; Ponticiello et al., 2020; WHO, 2021). In Western Kenya, in Homa Bay and Kisumu counties, it was noted that partner notifications and HIV testing for clients in the community were affected. This was because home testing was halted due to COVID-19 restrictions (Lagat et al., 2020). Moreover, the health care workers who used to follow up eligible clients for HIV testing in the community had to refer them for testing at the facility. This raised issues of distance and affordability of transport and fear of contracting COVID-19.

In South-western Uganda, HIV testing was negatively impacted in mainly two ways. These included COVID-19 restrictions preventing access to services and also the issue of the existence of COVID-19 related stigma among health care workers. Moreover, in 11 sub-Saharan countries, data tracked over 12 months showed a temporary effect on HIV services which then improved as measures to ensure continuity of HIV and treatment services were instituted (Harris et al., 2021). This aligns with a study in 65 South African primary health facilities, where there was an estimated 48% decrease in HIV testing during April 2020 was significantly associated with the COVID-19 lockdown (Dorward et al., 2021). A similar finding was realised on HIV testing reductions in Zambia, Malawi and South Africa whereby a recovery on the effects of HIV services was realised after the easing of lockdown restrictions (WHO, 2021). Between April and June 2020, there was a significant reduction in HIV testing by 50% in South Africa, 35% in Malawi and 22% in Zambia (WHO, 2021).

Thus, the findings of the literature review suggest that COVID-19 had a significant impact on the ability to deliver HIV testing services and support as we know it. Sub-Saharan African countries are the most affected by the HIV/AIDS epidemic and during the peak of the COVID-19

transmission, they were impacted by a break in services. The results from the literature review show that referrals for testing dwindled or stopped as facilities were prioritising COVID-19 related patients (Lagat et al., 2020). Lockdowns restricted movements of individuals who were uncertain about the availability of health care services in general and HIV testing was negatively reduced due to these containment measures implemented by governments.

Fear also played an important component in the reduction of clients who were tested and initiated onto ART as community members feared being infected with COVID-19 in the health care facilities. The studies reveal a drop in the rate of HIV testing coverage during this period; community health service provisions have been noted to be a good way of creating an enabling environment for the improved utilisation of HIV services (Sayles et al., 2009). Community HIV testing activities were halted after the advent of COVID-19 restrictions. This therefore had a significant effect with regard to slowing down the HIV-positive clients who could have been identified and put on treatment. The relatively high coverage of the effects of the utilisation of HIV services brought in the need to expand the frontiers of knowledge on the predictors of accessing the services during the COVID-19 pandemic period.

2.3.2 COVID-19 effects on HIV treatment services in Africa

Considerable gains have been realised in HIV treatment across the globe. HIV treatment services from ART drug refills and viral load monitoring among other HIV services were severely affected after the advent of COVID-19 (Assefa et al., 2021; Lagat et al., 2020). In Western Kenya, the turnaround of viral results increased from one to two weeks to several months due to diversion of laboratory results for COVID-19 (Lagat et al., 2020). There were reduced opportunities for client and health care worker clinic interactions as clients were referred directly to pharmacies for drug

pickups (Lagat et al., 2020). In Burkina Faso, Nigerian and Ethiopian health care providers noted that 18% of people living with HIV faced difficulty getting HIV treatment services (Assefa et al., 2021). More so, in Nigeria, Kenya, Tanzania and Uganda, there was a temporary decrease in HIV clinic visits (Dear et al., 2021). Issues of food security among people living with HIV was also noted as affecting adherence (Dear et al., 2021). However, as restrictions eased, ART initiations gradually improved towards pre-lockdown levels in Rwanda, Kigali. There was an association between residence and ART collection.

A study that focused on people in slum dwellings that included Nigerian and Kenyan perspectives showed that among slum dwellers, barriers included increased cost of health care, reduced household income and fear of COVID-19 infection, which were among the reasons that impacted access to services during the COVID-19 era. The affected services included screening for hypertension, HIV and TB among others (Ahmed et al., 2020). In 65 South African primary health facilities, there was a notable median decrease in ART initiations from 571 a week before COVID-19 lockdown restrictions to 375 a week post lockdown. The same study, however, noted no significant changes in the number of ART drug refill collection visits.

Regarding residence, people living with HIV who resided within Kigali utilised their ART drug refill appointments in comparison with 35% who stayed outside Kigali (Pierre et al., 2020). Being in the WHO clinical stage 1 was then associated with meeting the ART drug refill appointment at 48%, with 56% and 22% for those in clinical stages 3 and 4 (Pierre et al., 2020). An effect on access to isoniazid-preventative therapy (TPT) during the COVID-19 period has been documented (Bell et al., 2020). The TPT is particularly important for preventing TB in people living with HIV. In Uganda, there was a decline in the initiation of TPT by 75% in the first two weeks of April 2020

(Bell et al., 2020). More so, there was a recorded diversion of HIV and TB commodities production for COVID-19 items (Chanda-Kapata et al., 2022; Umviligihozo et al., 2020).

As noted above, access to ART was equally affected by the COVID-19. The utilisation of HIV treatment services such as ART drug refills, viral load monitoring and access to TB preventative treatment was not spared by COVID-19. Factors such as curtailing of movements, stigma and diversion of HIV resources to COVID-19 limited access to ART services, particularly during the peak of the pandemic from 2020–2022. Studies reviewed demonstrated how adherence to ART had taken a dip and therefore drastic measures were taken by public health professionals through mechanisms such as dispensing ART medication for a six-month period to avoid any defaulters. A differentiated model of delivery was seen in some of the studies reviewed, where treatment was dispensed outside the traditional clinic/hospital facilities. Initiatives such as home deliveries of medication were also noted as strategies initiated as a response to the gap in access to ART seen across already compromised public health care.

2.3.3 HIV services for women and children in Africa in the advent of COVID-19

Children who are living with HIV were also affected by the pandemic. Studies noted that pandemic restrictions and service disruptions impacted children living with HIV. Services affected included but were not limited to access to counselling, psychosocial and mental health support (Coker et al., 2021). Sub-Saharan African women remain at substantial risk of HIV acquisition, especially younger women between 15 and 24 years of age. The factors that predispose this age group to increased risk of HIV infection could have been aggravated by the COVID-19 pandemic including economic vulnerability due to the lockdown restrictions (Murewanhema, 2021).

2.3.4 HIV prevention services in Africa during the advent of COVID-19

Because of the potential risk of COVID-19 exposure for pregnant women, HIV preexposure prophylaxis (PrEP) in pregnancy was halted in various areas (Davey et al., 2020). However, it was argued that the benefits completely outweighed the COVID-19 risk. Therefore, there was advocacy for continued PrEP use and PrEP services for pregnant and breastfeeding women who are HIV negative and were at high risk of being infected by HIV (Davey et al., 2020).

2.3.5 Modelling the impact on HIV services Africa

Modelling studies also aided in projecting the impact of COVID-19 on HIV services (Jewell et al., 2020a; Jewell et al., 2020b). Studies predicted an intensification in the burden of HIV infections and TB if COVID-19 cases were not curtailed (Velavan et al., 2021). In one modelling study in South Africa, Zimbabwe, Uganda and Malawi, an interruption of three months for 40% of those on ART would in turn lead to similar additional number of deaths. More so, an interruption of six months would increase to 90% of the people living with HIV and for nine months would in turn make the deaths due to HIV exceed those of COVID-19 (Jewell et al., 2020b). In another modelling study, a similar picture was found in an interruption of six months in ART supply for at least half of the population of people who are living with HIV which would be expected to increase in HIV-related deaths in sub-Saharan African countries (Jewell et al., 2020b). In addition, with regard to HIV prevention programmes, the interruption in condom supplies and peer education would make populations more susceptible to HIV transmission and new infections (Jewell et al., 2020b). It was also predicted that disruptions to prevention programmes would have temporary negative effects and lead to an increase of new infections (Stover et al., 2020). Primary prevention programmes

included but were not limited to condom distribution, voluntary medical male circumcision and other HIV behaviour change programmes (Stover et al., 2020).

2.3.6 HIV and COVID-19 comorbidity in Africa

Current studies have reported no epidemiological relationship between HIV and COVID-19. However, people who are living with HIV are regarded as a vulnerable group to COVID-19; hence the need to ensure that they are vaccinated to guard against fears of heightened risk (Phiri et al., 2021). The impact of HIV on COVID-19 is not yet well understood but the available evidence points to the fact that uncontrolled HIV may negatively affect COVID-19 clinical outcomes (Snyman et al., 2021). In South Africa, a study ascertained that HIV-1 controllers and progressors may have significant implications for the risks and treatment of COVID-19 among people who are living with HIV (Stover et al., 2021). As such, it has been recommended that there is a need to make people who are living be prioritised for vaccination against COVID-19 (Mandala & Liu, 2021).

The HIV-infected are potentially at greater risk of dying due to COVID-19 considering this was also the case for instances of influenza (Nepomuceno, 2020). Thus, the HIV-infected population are a vulnerable group to negative COVID-19 outcomes. In Zambia, in a study looking at 29 autopsies, 28% (8/29) of the deaths had comorbidities that included HIV (Himwaze et al., 2021). In a related study in Lesotho and South Africa, HIV, TB and malaria were the predominant factors for COVID-19 mortality (Bell & Schultz Hansen, 2021). In a population cohort study of 3 460 932 participants, HIV was significantly associated with COVID-19 related mortality (Boulle et al., 2020). Moreover, current and previous diagnosis of TB were associated with COVID-19 deaths (Boulle et al., 2020). In a study in Zambia, HIV was among the top five comorbidities among

people who died of COVID-19. In another study in Nigeria, there was comparison of patients without comorbidities and those with HIV. The study found that those with HIV were 12 times more likely to die from COVID-19 (Osibogun et al., 2021). When comparing HIV-negative and HIV-positive patients, although the median 4C score was higher in HIV-positive patients there was no significant difference with regard to mortality (Venturas et al., 2021). More so although it was not statically significant, a study found that people living with HIV who lost their lives were of younger ages compared to those HIV negative (Jassat et al., 2021). In Zambia, areas that had higher HIV infection rates had more chance of having higher COVID-19 infection rates (Phiri et al., 2021).

The literature review suggest that HIV/AIDS increased the likelihood of adverse COVID-19 outcomes. Comorbidities such as TB, hypertension and diabetes were seen to pose an increased risk of mortality.

2.3.7 Risk of offering HIV services during the COVID-19 pandemic in Africa

Other studies have also documented the dangers of continuing to offer services during the COVID-19 pandemic. In terms of risks, it was modelled that maintaining HIV services could, in some way, lead to additional COVID-19 deaths which was 0.002 to 0.15 per 10,000 patients (Stover et al., 2021).

2.4 Responses to the Effect of COVID-19 on HIV in Africa

2.4.1 Community ART delivery

Expanding access to differentiated service delivery to people who are living with HIV was a good way to disrupt the effects of COVID-19 on accessing HIV treatment services (Wilkinson & Grimsrud, 2020). Strategies for expedited differential service delivery included expanding into community-based services (Grimsrud et al., 2021). Some strategies which were COVID-19 compliant included treatment adherence support through treatment supporters. These treatment supporters would provide cost effective means of having community-based ART. In response to COVID-19, HIV service delivery increased to multi-month dispensing of ART in the Ivory Coast, the Democratic Republic of Congo, Ethiopia, Eswatini, South Africa, Liberia, Togo, Zambia and Uganda (Grimsrud & Wilkinson, 2021). Home-based ART delivery was a strategy used in Uganda which leveraged the community ART distribution model for ART drug refills at designated pick-up points in communities (Golin et al., 2020).

2.4.2 Multi-month ART dispensing

The Ivory Coast, Ethiopia, Eswatini Kenya, Mozambique, Lesotho, South Africa, South Sudan, Uganda, Tanzania and Zimbabwe prioritised community-based models for delivering ART in communities. These countries wrote it within their HIV guides during COVID-19 (Zakumumpa et al., 2021). More so, South Africa, Ivory Coast and Liberia prioritised the need to align refills for all medications among people on ART (Grimsrud & Wilkinson, 2021). In addition, Uganda went to the extent of increasing multi-month dispensing from three to six months for stable patients (Zakumumpa et al., 2021).

2.4.3 Digital interventions

The use of digital health interventions to provide psychosocial support to people living with HIV was another innovation introduced during the pandemic. Digital cash transfers also proved more effective than food distribution for nutritional programmes among people who are living with HIV (Nyoni & Okumu, 2020). In Uganda, there was notable use of health information systems. These included the use of geospatial software to enhance ART drug refill distribution in areas which had not been mapped such as rural areas (Zakumumpa et al., 2021).

2.4.4 Utilising existing HIV infrastructure to fight COVID-19 in Africa

Existing infrastructure for fighting HIV/TB/Malaria provided by donors such as PEPFAR and Global Fund need to be used to respond to pandemics such as COVID-19 (Brault et al., 2021). Infrastructure provided by the programmes included being adaptive and placed a strong emphasis on data-driven programme approaches which provided an opportunity to strengthen the COVID-19 response activities (Golin et al., 2020).

2.4.5 Protecting vulnerable populations in Africa

The measures to control COVID-19 that were instituted neglected to speak to the realities in Africa, especially by protecting vulnerable populations (Amimo et al., 2020). Hence, it was recommended that COVID-19 responses should include measures that protect vulnerable populations in society, such people living with disabilities and children among others (Amimo et al., 2020).

2.5 Zimbabwe

2.5.1 Pre-COVID-19 era HIV services utilisation in Zimbabwe

In the pre-COVID-19 era, barriers and predictors of the utilisation of HIV treatment services in Zimbabwe were documented in the literature (Makurumidze et al., 2020; Tafuma et al., 2018). The HIV services utilisation noted in these qualitative studies in Zimbabwe were categorised as health system-related barriers, which included user fees, long waiting times, lack of confidentiality, negative attitudes by healthcare providers and lack of consistent community-based HIV services. Community-related barriers cited were stigma and discrimination, food insecurity, distance to facilities and counterproductive messaging from religious sectors. Client-related factors reported suboptimal involvement of men and defaulting treatment when symptoms disappear (Tafuma et al., 2018). More so in terms of predictors, being adolescent and young people (15–24 years), getting HIV care at primary health care, having initiated ART between 2014–2015 compared to 2012–2013, having WHO Stage 4 compared to Stage 1-3 predicted attrition from HIV care in Zimbabwe (Makurumidze et al., 2020). Since these studies were done in the context of the pre-COVID-19 era, there is now a need to explore the new barriers brought in by COVID-19, such as COVID-19 lockdowns and COVID-19 related stigma among others. More so, there is need to check if the barriers that existed before were further intensified by the outbreak of COVID-19.

2.5.2 COVID-19 and HIV in Zimbabwe

Recently, there have been increased efforts to document the effects of COVID-19 on various public health aspects in Zimbabwe although it is largely not yet adequate. In a perspective paper, Murewanhema and Makurumidze (2020) argued that the population in Zimbabwe who had other

chronic illnesses were bound to suffer the most. The paper argues that the reduced outpatient attendances and shortages of medicines increased the odds of death from COVID-19, including people who are living with HIV. This study was however from the perspective of lifting lockdowns in Zimbabwe and did not attempt to collect verifiable data. Thus, this was one weakness which the proposed study addressed. This study has ensured that there is empirical evidence highlighting how the utilisation of HIV services was affected or redefined.

Other descriptive studies in Zimbabwe have focused on the trends of COVID-19 cases, spatial distribution of cases, recoveries and deaths. Murewanhema et al. (2020) extracted publicly available data COVID-19 tests, confirmed cases, mortalities, recovered cases, active cases, local cases, imported cases and the countries where the returnees were coming from in Zimbabwe. The findings of the study showed that spatial distribution of the cases showed the greatest burden to be in Harare, Bulawayo and Matabeleland South provinces, while Matabeleland North and Mashonaland Central provinces had the lowest caseloads. Overall, urban provinces recorded higher caseloads compared to rural. This study will therefore add to these studies by narrowing down and seeking in-depth explanations of the impacts of COVID-19 on the utilisation of HIV services among people who are living with HIV, including their uptake of the COVID-19 vaccine.

More so, the perspectives of community and health care workers on the COVID-19 responses during the first two weeks of national lockdown in Zimbabwe has been documented in a qualitative study (Mackworth-Young et al., 2021). The study brought about four key findings that this study will also further narrow while looking at the layering of HIV and COVID-19. The qualitative study found that (1) there was an overload of COVID-19 information from untrusted sources (2) communities were in a compromised position to comply to all COVID-19 prevention measures

due to the need to earn daily income (3) shortage of personal protective equipped mad health workers feel at risk (4) other health conditions would be side-lined as resources were redirected to the fight against COVID-19. Further qualitative research is required with broader community stakeholders to provide more detailed understanding of community perceptions on the impact of COVID-19 which the study will address with a particular focus to people living with HIV in Zimbabwe.

2.5.3 Deficiencies in the existing literature

The studies discussed above were particularly critical in setting the pace and platform for exploring the intersection of COVID-19 and HIV outside the biological setting only. The studies are important in explaining the intensified risk of HIV and COVID-19 morbidity. The studies have measured the effects of the COVID-19 lockdowns that were put by governments to curb the spread of the COVID-19 virus. However, the studies did not adequately explore the predictors of utilising HIV services during the COVID-19 lockdowns which this study intended to address. Therefore, there was a gap in the knowledge with regard to the implications of COVID-19 in the utilisation of HIV care and services which are expected to be lifelong. In addition, there needs to be more documented knowledge about people who are living with HIV who are at increased risk of death from COVID-19, whether there is COVID-19 vaccine hesitancy among them and the reasons behind these fears. Currently, there is inadequate documentation in Zimbabwe on issues of vaccine hesitancy among people who are living with HIV. Objective 4 of this study explored the utilisation of the vaccine among people who are living with HIV.

2.6 Theoretical Framework

2.6.1 The Andersen's Behavioral Model of Health Services Utilisation

The study was premised on the fifth version of the Andersen's Behavioral Model of Health Services Utilisation (1995). This model argues that use of health services is due the influence of factors classified as (1) predisposing, (2) enabling and (3) need factors. First, the predisposing factors include the pre-existing socio-cultural characteristics before accessing a health service. These may include demographic characteristics. Second, the enabling factors are those that involve the logistical way of accessing the health service. These may include the means of accessing such as income among others. At the community level, these may imply available health human resources. These may also include genetic factors and psychological characteristics. Third, the need factors are the push factors that prompt the immediate use of a health service (Andersen, 1995). The framework has since gone through phases which include adding environmental factors which the study also explored. The model for this study was edited to also disaggregate the predisposing, enabling, need and environmental factors into individual, structural and health system factors.

2.6.2 Relevance of model to the study

The model was chosen for this study as one of the framework purposes was to discover conditions that either impeded or facilitated utilisation of health services. The outbreak of COVID-19 brought several challenges with regard to utilisation of health services. Hence, there was a need to utilise a framework which would clearly show the conditions facilitating or impeding utilisation of health services during the COVID-19 era. In this study, the framework was useful in discovering

conditions that impeded or facilitated access and uptake of HIV treatment services by people living with HIV who are on ART. The goal of the framework was to develop a behavioural model that provides measures of access to health care which this study also attempted to do with regard to HIV treatment services in Zimbabwe during the COVID-19 period. The health services utilisation model prioritises important predisposing, enabling and need factors in explaining access to health services (Andersen, 1995).

A variety of studies have used the Anderson health utilisation model to explore predisposing, enabling and need factors globally and in African contexts. Lo et al. (2018) applied the health services utilisation model to examine the importance of predisposing, enabling and need variables to the social mechanisms explaining lifetime HIV testing across racial/ethnic groups. Predisposing factors such as female gender, older age and sexual minority status were found to consistently increase lifetime HIV testing. Tan (2009) used the Anderson health utilisation model to explore health service utilisation in the United States of America. The model has been used successfully in the African context. In Uganda, Mbalinda et al. (2020) used the Anderson health care utilisation model while assessing contraceptive use among sexually active perinatal HIV-infected adolescents. The study found that the factors associated with contraceptive use included predisposing factors such as age, sex and education. In terms of enabling factors, perceived need of family planning was significantly associated with contraceptive use. In Ghana, Seidu (2020) went on to use Anderson's model of health service utilisation to assess the access to HIV testing services by sexually active men in Ghana. Predisposing factors such as age (30–39), marriage and higher levels of education were associated with higher odds of being tested for HIV. Enabling

factors such as men who have subscribed to health insurance and those in the rich wealth quintile also meant higher odds of HIV testing.

In terms of the strengths of the Andersen's Behavioral Model of Health Services utilisation, it has been noted flexible and also gives room to come up with a strong discussion of health utilisation factors (Azfredrick, 2016). More so, it has been further noted that the Anderson model variables can be used in a variety of settings whether rural or urban and developed or underdeveloped areas among other settings (Azfredrick, 2016). More so the model can be applied in non-health issues. It can also be used for specific service use, for example, it has been used on panic attack treatment study in United States of America (Goodwin & Andersen, 2002). Hence, in this study, it was particularly useful in exploring specific services with regard to access and uptake of HIV treatment among people living with HIV on ART.

In terms of weaknesses, the model has been noted to not giving enough attention to culture; however, Andersen argues that social structure is included in the predisposing characteristics component (Guendelman, 1991). This study, in terms of social interactions and culture, explored religion and gender among others. Another criticism was the overemphasis of need factors at the expense of beliefs (Wolinsky & Johnson, 1991). However, Andersen argues that need itself is a social construct.

In terms of assessing if COVID-19 intensified or redefined utilisation of HIV treatment services in Zimbabwe, the predisposing factors that were prioritised include age, as the study also wanted to explore if there are differences between adolescents, young people and adults, to see if there is a need for age group-specific responses to ensure maximum utilisation of the services. The other predisposing factors include sex, marriage, religion, and education. It was critical to assess if these

factors intensified utilisation challenges during the COVID-19 period. Another new predisposing factor that was explored by the study was to know if prior vaccination for COVID-19 facilitated or impeded the utilisation of HIV treatment services.

It is potentially possible that COVID-19 may have either brought in new enabling factors or intensified barriers. As such, the study investigated enabling factors such as COVID-19 related stigma that may include reluctance by health care workers to offer HIV treatment services to people who are living with HIV, or who may have presented with suspected TB or malaria which may have resembled COVID-19 symptoms. Other enabling factors that were explored include COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services, and COVID-19 related stigma among health care workers. The need factors that were explored include pregnancy during the COVID-19 period, opportunistic infections (TB, STIs etc.) during COVID-19 period, COVID-19 infection, and being in contact with a COVID-19 case.

To take environmental factors into account, this study modified Andersen's Behavioral Model of Health Services Utilisation by adding environmental factors. Instead of defining environmental factors as enabling factors, the adapted Andersen model in this study added environmental factors as a factor besides predisposing, enabling and need factors. The study explored residence (urban/rural) and type of health facility (primary care facilities/district hospitals/provincial hospitals) in accessing and uptake of HIV treatment services. Figure 2.1 below shows the health utilisation model for HIV treatment services in the context of COVID-19 in Zimbabwe adapted from the Anderson model.

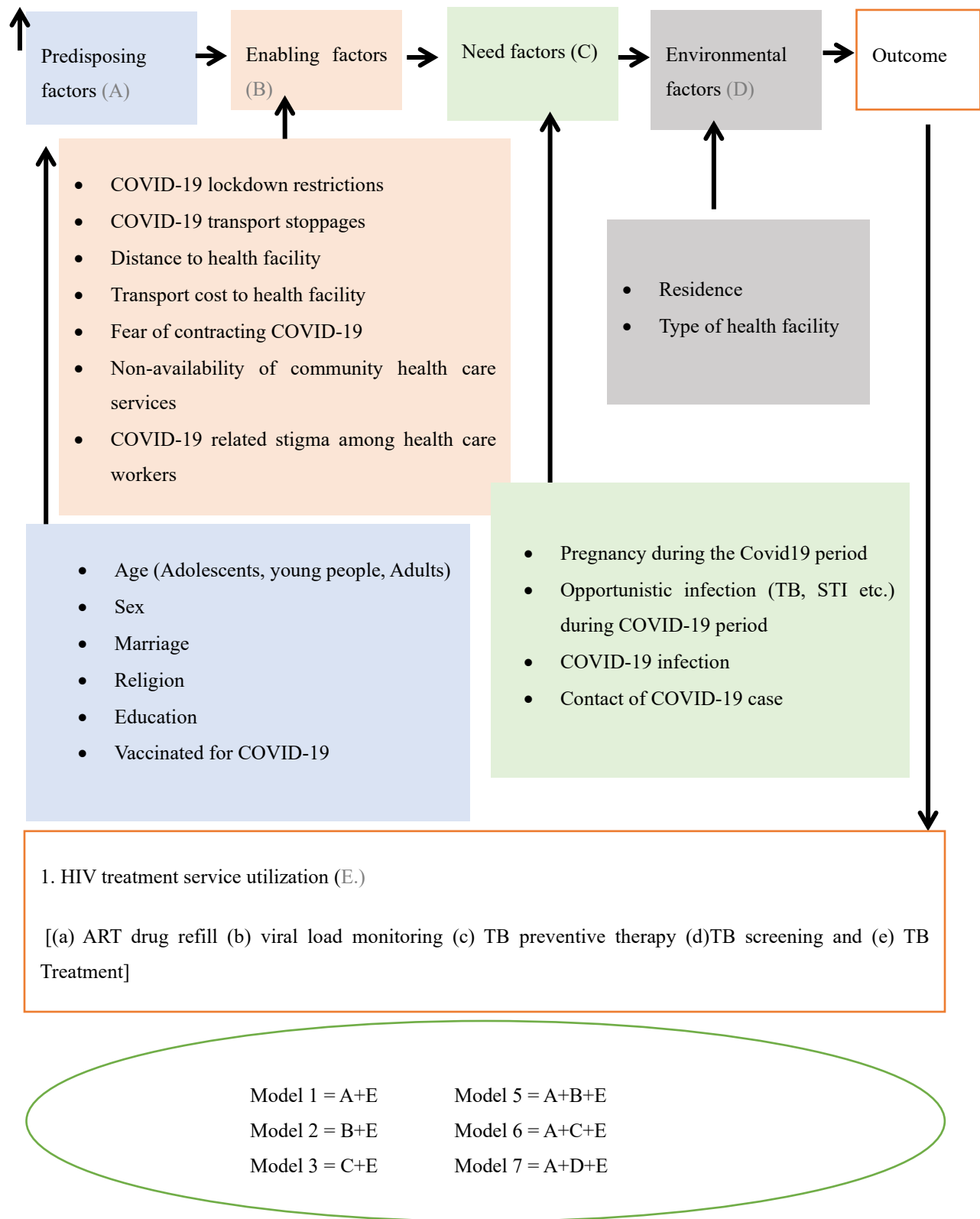


Figure 2.1: The health utilisation model for HIV treatment services in the context of COVID-19 in Zimbabwe

Thus, in essence the Anderson model was used to confirm if demographic and socio-cultural characteristics of individuals that existed prior to accessing health services (A: predisposing factors) had implications for HIV treatment services during the COVID-19 period. In addition, logistical aspects, means and resources of accessing services (B: enabling factors) were also explored in relation to taking up the HIV care treatment services during the COVID-19 period. The immediate and important reasons for utilisation of health services (C: need factors) were also explored. The D: environmental factors, such as residence and type of health facility were assessed separately not as part of the enabling factors.

In terms of model building for this study, Model 1 had predisposing factors (A+E), while Model 2 had enabling factors (B+E), Model 3 had need factors (C+E) and Model 4 (D+E) had environmental factors. In addition, Model 5 had predisposing factors and enabling factors (A+B+E). Model 6 had predisposing factors and need factors (A+C+E). Model 7 had predisposing and environmental factors (A+D+E). Model 8 had the full model with predisposing, enabling, need and environmental factors (A+B+C+D+E).

2.7 Research Hypotheses for this Study

The significance of the relationship was tested by examining the p-value corresponding to the estimated odd ratios, with the p-value set at 95% significance level ($\alpha=0.05$).

2.7.1 Hypothesis one

H₀: Predisposing factors (age, sex, marriage, religion, education, COVID-19 vaccination) are not associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

H₁: Predisposing factors (age, sex, marriage, religion, education, COVID-19 vaccination) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

significance level ($\alpha=0.05$)

2.7.2 Hypothesis two

H₀: Enabling factors (COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services, COVID-19 related stigma among health care workers) are not associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

H₁: Enabling factors (COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services, COVID-19 related stigma among health care workers) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

significance level ($\alpha=0.05$)

2.7.3 Hypothesis three

H₀: Need factors (pregnancy during the COVID-19 period, opportunistic infection during COVID-19 period, COVID-19 infection, contact with COVID-19 case) are not associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

H₁: Need factors (pregnancy during the COVID-19 period, opportunistic infection during COVID-19 period, COVID-19 infection, contact with COVID-19 case) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

significance level ($\alpha=0.05$).

2.7.4 Hypothesis four

H₀: Environmental factors (residence (urban /rural) and type of health facility) are not associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

H₁: Environmental factors (residence (urban /rural) and type of health facility) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

significance level ($\alpha=0.05$)

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter describes the study setting, design and data sources used in this study. In addition, it describes the sampling and variables used for the study. The data collection instruments and steps in data analysis are also described in the Chapter. Lastly, the chapter describes the ethical issues that were observed in the study.

3.2 Study Setting

The study area was in Zimbabwe. Zimbabwe is a landlocked country situated in Southern Africa. The country is bordered by Mozambique to the east, South Africa to the south, Botswana to the west and Zambia to the north and northwest.



Figure 3.1: Map of Zimbabwe (World Atlas, 2021)

The country has 10 provinces and the country's 2017 Inter-Censal Demographic Survey noted that there is a total population of 13.5 million people of which 52% are females. The population is relatively young with 40% of the population below the age of 15 years and about 6%, 65 years and above (ZIMSTAT, 2017). Zimbabwe currently has 1.3 million people living with HIV (UNAIDS, 2020).

3.3 Study Design

A mixed method approach was used, utilising a concurrent triangulation design. A concurrent study design is an approach in which both quantitative and qualitative data are collected at the same time. The quantitative data was collected from people who are living with HIV on ART through a structured questionnaire. The quantitative questionnaire asked about all the predisposing, enabling, need and environmental factors as they relate to accessing or not accessing the expected HIV treatment services per each sample person living with HIV on ART. On the qualitative data collection modality, qualitative data was collected through in-depth interviews with purposively sampled key stakeholders such as community HIV volunteers, district HIV focal persons and district health promotion officers. The analysis of the quantitative and the qualitative data was conducted separately yet concurrently. The findings were integrated during the results and interpretation phases of the study.

3.4 The Population and Sample

3.4.1 Population

The relevant population for this study was people living with HIV aged 15 years and older. These were differentiated as adolescents and young people (aged 15–24) and adults (aged 24+). The study

excluded children below the age of 15. Community volunteers in the form of Village health workers and CATS were sampled for in-depth interviews. Key informants in the form of District HIV focal persons, and District Health Promotion Officers were also interviewed to document their perspectives and observations on how the COVID-19 outbreak influenced retention in HIV treatment services.

3.4.2 Sample

The study adopted a 3-stage cluster random sampling technique. Participants were drawn from five provinces of Zimbabwe (Harare, Manicaland, Mashonaland East, Matebeleland South and Midlands). The sample was calculated using the below stated formula:

$$n = \frac{(Z\alpha)^2 [p (1-p)]}{(d)^2}$$

Where n was the minimum sample size

$Z\alpha$ = Standard normal deviate corresponding to a 2-sided level of significance of 5%

p1 = ART coverage in Zimbabwe 81% among people living with HIV (0.81)

$q = 1-p = 1-0.81 = 0.19$

d = desired precision = 5% = 0.05

The sample size of 2 096 people living with HIV was planned for as per the calculation above and 2 157 people living with HIV were enrolled and participated in the study. Thirty-six percent of these were adolescents and young people. Table 3.1 below shows the sample by mode of data collection that was used. The adolescents and young people (15–24) were identified through Community Adolescent Treatment Supporters (CATS) from Zvandiri as they do their routine

support work, while data for adults (25+) were identified by Community Health Agents (CHAs) from Zimbabwe National Network of People Living with HIV (ZNNP+) as they also do their routine supportwork. Table 3.0.1: Sample for the study

TARGET GROUP	MODE OF DATA COLLECTION	PLANNED (CALCULATED SAMPLE)	ACTUAL (WHERE DATA WAS COLLECTED)
PEOPLE LIVING WITH HIV, ADOLESCENTS AND YOUNG PEOPLE (15–24)	Questionnaire	783	791
PEOPLE LIVING WITH HIV ADULTS (24+)	Questionnaire	1313	1366
VILLAGE HEALTH WORKERS (COMMUNITY VOLUNTEERS)	In-depth Interview	12	12
COMMUNITY ADOLESCENT TREATMENT SUPPORTERS (CATS) (YOUTH COMMUNITY VOLUNTEERS)	In-depth Interview	12	12
DISTRICT HIV FOCAL PERSON	Key Informant Interview	6	6
DISTRICT COMMUNITY NURSE	Key Informant Interview	6	6
DISTRICT HEALTH PROMOTION OFFICER	Key Informant Interview	6	6

3.5 The Instruments

In the quantitative phase of the collection an interviewer-administered structured questionnaire was administered to collect data from people living with HIV. The questionnaire was in the English and Shona languages. The first question of the questionnaire asked general information which informed the environmental factors which were residence and type of health facility. The second section delved into predisposing factors which profiled the study participants such as age, gender, marital status, religion and education. The third section asked about their use of ART drug refills, viral load monitoring, TB preventative therapy and TB screening. The use of services questions asked if the study participant accessed the services during the COVID-19 period, the reasons why they did not access them and the challenges faced. The fourth section asked about need factors as they related to having an opportunistic infection, pregnancy, being in contact with a COVID-19 case and having been infected by COVID-19. The last section asked about COVID-19 vaccination and the reasons for not getting vaccinated. The questionnaire asked about all the objectives of the study. In the qualitative phase, in-depth and key informant interviews were done using a semi-structured interview guide. The semi-structured guide asked information related to the challenges of accessing HIV services and COVID-19 vaccinations during the COVID-19 period among people living with HIV. This information provided more understanding into the factors.

3.6 Data Collection Procedure

First, the questionnaire was pretested in Harare on 48 people living with HIV. After pretesting, minor adjustments were made to the Shona questionnaire so that it portrayed the exact clarity of the questions. Second, training was done with the data collectors on the aim of the research and

the questionnaire. The quantitative data from the questionnaire was collected electronically through the CommCare application. The CommCare application was installed on each android phone that was being used by the CATS and CHAs who participated in the data collection process. The data collectors were trained on how to use the android devices to collect data. In addition, routine data uploads were checked by a dedicated data monitor. The interviewers would first read the instructions to the participants and ensure the signing of consent. English and Shona were used to interact with the study participants depending on what the study participant preferred. The data collectors were fluent in both languages. Data was collected from October 2022-January 2023.

3.7 Variables and Measures

The variables were selected based on the reviewed literature and the Anderson health utilisation model.

3.7.1 Dependent variable

The dependent variable for this study was the use of HIV treatment services. The outcome variable was defined as the utilisation of HIV treatment services which consisted of four HIV services, namely, ART drug refills, viral load monitoring, TB preventative therapy and TB screening. The other services listed as an outcome was COVID-19 vaccinations among people living with HIV. The question was asked: “In the past 24 months did you manage to collect your ART drug refill on the set appointment” with a yes/no response. Each of the outcome variables was coded as binary with “1” representing the utilisation of HIV treatment services and “0” representing the non utilisation of HIV treatment services during the COVID-19 period. On COVID-19 vaccinations, the dependent variable was the utilisation of the COVID-19 vaccine among people living with

HIV. Each of the outcome variables was coded as binary with “1” representing the utilisation of the COVID-19 vaccine and “0” representing not yet vaccinated for COVID-19.

3.7.2 The independent variables

The independent variables were categorised as predisposing, enabling, need and environmental factors using the Anderson health utilisation model. Predisposing factors are the sociodemographic variables that exist before seeking a health service; enabling factors are those logistical aspects for accessing a service while need factors are those emergency needs that push for access to a service. The predisposing factors that were prioritised included: age – as the study wanted to explore if there were differences between adolescents, young people, and adults, to see if there is a need for age-group-specific responses to ensure maximum utilisation of the services. The other predisposing factors included sex, marriage, religion and education. Another new predisposing factor that was explored by the study was to ascertain if prior vaccination for COVID-19 facilitated or impeded the use of HIV treatment services. The study investigated enabling factors such as COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services and COVID-19 related stigma among health care workers. The need factors that were explored included pregnancy during the COVID-19 period, opportunistic infections (TB, STIs etc.) during the COVID-19 period, COVID-19 infections and being in contact with a COVID-19 case. The study explored residence, type of health facility (primary care facilities/district hospitals/provincial hospitals) as environmental factors in accessing and taking up HIV treatment services. The predisposing factors included: age (15–19, 20–24, 25–39, 40–54, 55+), sex (male, female) marriage (not married, married), religion (Roman Catholic, Apostolic Sect, Pentecostal/

protestant, other religions), education (primary, secondary, tertiary, do not know/did not attend school/no answer), COVID-19 vaccination (yes/no). The enabling factors included: COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services and COVID-19 related stigma among health care workers. The need factors included opportunistic infection during COVID-19 period (yes/no), COVID-19 infection (yes/no) and contact with COVID-19 case (yes/no) while environmental factors were residence (urban /rural) and type of health facility (central/provincial health facility, district health facility, primary health care facility).

These intervening variables were particularly chosen for the study due to the understanding that different existing conditions and practices and environmental factors among others could have either positively or negatively impacted health metrics during the pandemic era.

3.8 Ethical Issues

Ethics approval was granted by the Medical Research Council of Zimbabwe under reference MRCZ/A/2868 and also University of the Witwatersrand Ethics Committee (Medical) under reference number: M220425. Assurance of anonymity and confidentiality of their results was guaranteed to the survey participants. Furthermore, participation in the data collection process was voluntary.

3.9 Steps in Data Analysis

Quantitative statistical analysis was performed using STATA software (Version 14). STATA is a software that is used to perform statistical analysis. Using this software, the data was first prepared for analysis. The data preparation involved regrouping of variables responses to education and religion to allow better data analysis and better interpretation. Data responses were also correctly labelled to allow for quantitative analyses. Data was also grouped by age into the 15–24 and 25+ groups to allow for comparison between the two. Second, frequency distributions and the Chi-square test of association were used at the univariate and bivariate levels of analysis. In this stage, enabling, predisposing, need and environmental factors were juxtaposed to understand the use of HIV services as a way of answering Objective 1. Then, the STATA software was used to perform multivariate logistic regression to identify the predictors of the use of HIV treatment services so as to answer Objective 2. The multivariate logistic regression was also run by age so as to compare the predictors of HIV treatment services between adolescents and young people aged 15–24 and adults 25 years and older to answer Objective 3. This same process was done for Objective 4 with a change of the outcome from HIV services to COVID-19 vaccination among people living with HIV. All the quantitative analyses were conducted at $\alpha = 0.05$ significance. Adjusted odds ratios (AOR) with corresponding p-values were reported. All covariates from the bivariate analysis were included in the multivariate analyses regardless of them being significant. Data were analysed using the below model building strategy.

Where:

A = Predisposing factors, B = Enabling factors, C = Need factors, D = Environmental factors, E = (1) utilisation of ART drug refills, (2) viral load monitoring, (3) TB preventative therapy, (4) TB screening

Table 3.0.2: Model building strategy

Model	Formula	Variables
Model 1	A	(A) age (15-19, 20-24, 25-39, 40-54, 55+), sex (male, female) marriage (not married, married), religion (Roman Catholic, Apostolic Sect, Pentecostal/Protestant, other religions), education (primary, secondary, tertiary, do not know/did not attend school/no answer), COVID-19 vaccination (yes/no).
Model 2	B	(B) COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services and COVID-19 related stigma among health care workers.
Model 3	C	(C) included opportunistic infection during COVID-19 period (yes/no), COVID-19 infection (yes/no) and contact with COVID-19 case (yes/no).
Model 4	D	(D) were residence (urban /rural) and type of health facility (central/provincial health facility, district health facility, primary health care facility).
Model 5	A + B	(A) age (15-19, 20-24, 25-39, 40-54, 55+), sex (male, female) marriage (not married, married), religion (Roman Catholic, Apostolic Sect, Pentecostal/Protestant, other religions), education (primary, secondary, tertiary, do not know/did not attend school/no answer), COVID-19 vaccination (yes/no). (B) COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services and COVID-19 related stigma among health care workers.
Model 6	A + C	(A) age (15-19, 20-24, 25-39, 40-54, 55+), sex (male, female) marriage (not married, married), religion (Roman Catholic, Apostolic Sect, Pentecostal/Protestant, other religions), education (primary, secondary, tertiary, do not know/did not attend school/no answer), COVID-19

		vaccination (yes/no). (C) included opportunistic infection during COVID-19 period (yes/no), COVID-19 infection (yes/no) and contact with COVID-19 case (yes/no).
Model 7	A + D	(A) age (15–19, 20–24, 25–39, 40–54, 55+), sex (male, female) marriage (not married, married), religion (Roman Catholic, Apostolic Sect, Pentecostal/Protestant, other religions), education (primary, secondary, tertiary, do not know/did not attend school/no answer), COVID-19 vaccination (yes/no). (D) residence (urban /rural) and type of health facility (central/provincial health facility, district health facility, primary health care facility).
Model 8 (Full Model)	A + B + C + D	(A) age (15–19, 20–24, 25–39, 40–54, 55+), sex (male, female) marriage (not married, married), religion (Roman Catholic, Apostolic Sect, Pentecostal/Protestant, other religions), education (primary, secondary, tertiary, do not know/did not attend school/no answer), COVID-19 vaccination (yes/no). (B) COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services and COVID-19 related stigma among health care workers. (C) opportunistic infection during COVID-19 period (yes/no), COVID-19 infection (yes/no) and contact with COVID-19 case (yes/no) (D) were residence (urban /rural) and type of health facility (central/provincial health facility, district health facility, primary health care facility).

Qualitative analysis was undertaken using the NVIVO software (version 12). The NVIVO software is basically a software that allows for the collaborating and organising of text data. Therefore, to review more significant effects from the in-depth interviews conducted in this study, NVIVO was used. As I conducted the interviews I jotted down notes from the responses to the interview guide. I then created summaries and assigned codes to the data with the aid of the NVIVO software. I then categorised the codes and sorted the main themes that related to the challenges in accessing HIV services and COVID-19 vaccination and the reasons for not accessing HIV services by predisposing, enabling, need and environmental factors.

3.10 Dissemination

3.10.1 Manuscripts under review

Tapera, T., & Odimegwu, C., et.al. (2023). Intersecting epidemics: COVID-19 and HIV in sub-Saharan Africa. A systematic review (2020–2022). *African Journal for Public Health*. [Status: Published]

Tapera, T., Odimegwu, C., & et al. (2023). Intersecting epidemics: The predictors of continued utilization of HIV treatment services during the COVID-19 outbreak among people living with HIV in Zimbabwe. *AIDS and Behaviour*. [Status: Published]

Tapera, T., Odimegwu, C., & et al. (2023). The predisposition of people living with HIV on antiretroviral therapy to utilize the COVID-19 vaccine and factors that influence their decision in Zimbabwe: A mixed methods study. *AIDS Research and Treatment*. [Status: Under review]

3.10.2 Workshops and conferences

Oral presentation: *The implications for adolescent sexual and reproductive health and rights in Zimbabwe?* International Union for the Scientific Study of Population (IUSSP) Webinar on The COVID-19 Pandemic and Sexual & Reproductive Health in Africa, 31 August 2020. <https://iussp.org/sites/default/files/Talent%20Tapera%20Presentation%20Covid19%20%26%20SRH%20in%20Zimbabwe.pdf>

Discussant: *Session 1 (Healthcare Access & Utilization)*, Population and Reproductive Health Dynamics under COVID-19 in sub-Saharan Africa Conference, 14–16 March, 2022, University of Witwatersrand, South Africa.

CHAPTER FOUR: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF STUDY RESPONDENTS

4.1 Introduction

This chapter describes the sociodemographic characteristics of the people living with HIV that were sampled for this study. In addition, the chapter presents the use of HIV services among people living with HIV after the advent of the COVID-19 pandemic through bivariate analysis by predisposing, enabling, need and environmental factors. The data are also triangulated with a sample of interruption in treatment data from an ART clinic.

4.2 Sociodemographic Characteristics of All Study Participants

A total of 2 157 people living with HIV aged 15 years and older who were on ART before the advent of COVID-19 were included in the study as reported in Table 4.1. Most of the participants were adults aged 25 years and above (63%), while adolescents and young people were 37%. The majority of the participants were female (63%) while 37% were male. The majority (58%) were not married and 42% were married. More than half of the study participants (64%) were from rural areas and 36% were from urban areas. Pentecostal/Protestants contributed to the majority representation with 35%. The majority (66%) had gone through secondary education. Most of the participants (70%) access their HIV services from primary health care facilities. The majority of the participants had been vaccinated for COVID-19 (86%).

Table 4.0.1: Distribution of sociodemographic characteristics of study participants (N=2 157)

Categories	Frequency	Percentage
Age		
15–24	791	36.67
25–34	300	13.91
35–44	414	19.19
45+	652	30.23
Sex		
Male	806	37.37
Female	1 351	62.63
Marital Status		
Not married	1 246	57.77
Married	911	42.23
Residence		
Rural	1 374	63.70
Urban	783	36.30
Religion		
Roman Catholic	225	10.43
Apostolic Sect	475	22.02
Pentecostal/ Protestant	754	34.96
Other religions	703	32.96

Categories	Frequency	Percentage
Education		
Primary	492	22.81
Secondary	1 426	66.11
Tertiary	129	5.98
Do not know/Did not attend school/No answer	110	5.10
Type of Health Facility		
Central /provincial health facility	94	4.30
District health facility	556	25.70
Primary health care facility	1 507	69.87
Vaccinated for COVID-19		
Yes	1 851	85.81
No	306	14.19

4.2.1 Sociodemographic characteristics of adolescents and young people living with HIV sampled for the study

A total of 791 adolescents and young people living with HIV aged 15–24 who were on ART before the advent of COVID-19 were a sub-set included in the study as reported in Table 4.2. Among adolescents and young people, the majority of the participants were female (52%) while 48% were male. The majority (83%) were not married and 17% were married. More than half of the study participants (64%) were from rural areas and 36% were from urban areas. Other religions

contributed to the majority representation with 44% while Pentecostal/Protestant contributed to 31%. The majority (73%) had gone through secondary education. Most of the adolescents and young people living with HIV sampled for the study were accessing their HIV services from primary health care facilities. Most of the participants had been vaccinated for COVID-19 (76%).

Table 4.0.2: Distribution of sociodemographic characteristics of adolescents and young people living with HIV sampled for the study (N=791)

Categories	Frequency	Percentage
Sex		
Male	378	47.79
Female	413	52.21
Marital Status		
Not married	658	83.19
Married	133	16.81
Residence		
Rural	443	56.01
Urban	348	43.99
Religion		
Roman Catholic	78	9.86
Apostolic Sect	123	15.55
Pentecostal/ Protestant	243	30.72
Other religions	347	43.87

Categories	Frequency	Percentage
Education		
Primary	65	8.22
Secondary	579	73.20
Tertiary	83	10.49
Do not know/Did not attend school/No answer	64	8.09
Type of Health Facility		
Central /Provincial health facility	78	9.86
District health facility	80	10.11
Primary health care facility	633	80.03
Vaccinated for COVID-19		
Yes	602	76.11
No	189	23.89

4.2.2 Sociodemographic characteristics of adults living with HIV sampled for the study

A total of 1 366 adults living with HIV aged 25+ who were on antiretroviral therapy before the advent of COVID-19 were a sub-set included in the study as reported in Table 4.3. Among the adults, the majority of the participants were female (69%) while 31% were male. The majority (57%) were married and 43% were not married. More than half of the study participants (68%) were from rural areas and 36% were from urban areas. Pentecostal/Protestants contributed to the

majority representation with 37% while the Apostolic Sect contributed to 26%. The majority (62%) had gone through secondary education. Most of the adults living with HIV sampled for the study were accessing their HIV services from primary health care facilities (64%). The majority of the participants had been vaccinated for COVID-19 (91%).

Table 4.0.3: Distribution of sociodemographic characteristics of adults living with HIV sampled for the study (N=1 366)

Categories	Frequency	Percentage
Sex		
Male	428	31.33
Female	938	68.67
Marital Status		
Not married	588	43.05
Married	778	56.95
Residence		
Rural	931	68.16
Urban	435	31.84
Religion		
Roman Catholic	147	10.76
Apostolic Sect	352	25.77
Pentecostal/ Protestant	511	37.41
Other religions	356	26.06

Categories	Frequency	Percentage
Education		
Primary	427	31.26
Secondary	847	62.01
Tertiary	46	3.37
Do not know/Did not attend school/No answer	46	3.37
Type of Health Facility		
Central /Provincial health facility	16	1.17
District health facility	476	34.85
Primary health care facility	874	63.98
Vaccinated for COVID-19		
Yes	1 249	91.43
No	117	8.57

4.3 Utilisation of HIV Services Among People Living with HIV After the Advent of COVID-19

Table 5.1 shows the bivariate analysis of the proportion of utilisation of HIV services among people living with HIV during COVID-19 restriction periods by predisposing, need and environmental factors. Tuberculosis (TB) screening services had relatively lower utilisation of 83% and above and below 90% for TB preventative therapy across all predisposing, need and environmental factors.

4.3.1 Predisposing factors

Age was statistically significant at $p = 0.00$ at bivariate analysis across utilisation of ART drug refills, viral load monitoring, TB preventative therapy and TB screening. The study found that the age group 25–34 contributed to the majority ($\geq 10\%$) of people living with HIV who had interruptions in accessing ART drug refills, viral load monitoring and TB preventative therapy. Older age groups from 45 years and older had higher utilisation, such as ART drug refills and viral load monitoring with 96% utilisation of ART drug refills and 93% on viral load monitoring. The study found sex not statistically significant at bivariate analysis of sex and utilisation of HIV services. Utilisation of HIV services was slightly higher by proportion in females than males in ART drug refills (92% male, 96% female) and viral load monitoring (89% male, 90% female). However, with regard to TB preventative therapy (86% male, 85% female) and TB screening (77% male, 73% female), the study found the opposite as there was higher utilisation in males. The study further found that marriage was not statistically significant at bivariate analysis with utilisation of the four HIV services. Utilisation of HIV services was higher in participants who were married for ART drug refills and TB preventative therapy (94% and 86% on ART drug refills on the not married and married respectively and 92% and 85% on TB preventative therapy respectively). However, the proportion of utilisation was the same for viral load monitoring (90%) and TB screening (75%) among the married and not married. Religion was also statistically significant at bivariate analysis with utilisation of HIV services. In comparison to other religions and the apostolic sects, the study found a relatively lower utilisation of ART drug refills for Roman Catholic (92%) and Pentecostal/Protestant (92%). The same trend was realised for TB preventative therapy with Roman Catholic (83%) and Pentecostal/Protestant (71%) utilisation.

The study revealed that there was a lower proportion of utilisation of all the four HIV services among people living with HIV who were not vaccinated for COVID-19. For ART drug refills there was 89% compared to 94% for the vaccinated and unvaccinated respectively. Education was also significantly associated with utilisation of ART drug refills, viral load monitoring and TB screening. The study revealed that there was a higher proportion of utilisation of all four HIV services among people living with HIV who were vaccinated for COVID-19 than not vaccinated. For ART drug refills there was 94% compared to 89% for the vaccinated and unvaccinated respectively. This was followed by 91% and 90% for viral load monitoring, 86% and 81% for TB preventative therapy and 76% and 65% for TB screening respectively. Being vaccinated for COVID-19 was significantly associated with the utilisation of HIV services.

4.3.2 Need factors

Females living with HIV who were pregnant during the period of COVID-19 restrictions had higher utilisation of HIV services. The study found that 17% (196/1155) of the females living with HIV that participated in the study had been pregnant during the COVID-19 period. Of these females living with HIV who were pregnant in the COVID-19 period, 5% (10) missed their ART drug refill appointments, 10% (19) missed their viral load monitoring, 14% (27) had not received their TB preventive therapy and 23%(46) did not get TB screened. In regard to ART drug refills, pregnant females had a higher utilisation of 94% in comparison with 93% for those that were never pregnant during the period. The same trend was similar for TB screening which was 77% and 73% for pregnant and non-pregnant females in the COVID-19 restriction periods respectively. For viral load monitoring the utilisation proportion was similar at 90% for both and 86% and 85% respectively for TB preventative therapy. Opportunistic infections during the COVID-19

restriction periods had a relatively higher utilisation proportion compared to people living with HIV who did not have opportunistic infections across all four HIV services. Opportunistic infections were found statistically significant for utilisation of viral load monitoring and TB preventative therapy. Thus, for opportunistic infections and having no opportunistic infections it was 95% and 93% for ART drug refills, 95% and 89% for viral load monitoring, 89% and 85% for TB preventative therapy and 87% and 75% for TB screening respectively.

There was a marginal proportional difference (92% and 93%) in utilisation of ART drug refills among people living with HIV who had been infected and those not infected with COVID-19 respectively. Viral load monitoring had similar proportions (90%) in utilisation among people living with HIV who had been infected and those not infected with COVID-19. There was a higher proportion of utilisation (87% and 85%) of TB preventative therapy among people living with HIV who had not been infected than those who had been infected with COVID-19 respectively. Similarly, there was a higher proportion of utilisation (79% and 74%) of TB screening among people living with HIV who had not been infected with COVID-19 than those infected with COVID-19 respectively. Being in contact with a COVID-19 case or not had similar proportions of utilisation for ART drug refills (93%), viral load monitoring (90%) and TB preventative therapy (85%). However, being in contact with a COVID-19 case or not had a proportional difference of 78% and 73% respectively in utilisation of TB preventative therapy.

Table 4.0.4: Proportion of utilisation of HIV services among people living with HIV during COVID-19 restriction periods by predisposing, need and environmental factors (N = 2 157)

Categories	Total	Number utilising HIV services (N) and Percent (%)			
		ART drug refill	Viral load monitoring	TB preventative Therapy	TB screening
Predisposing factors					
Age		**	**	**	**
15–24	791	727 (92%)	715 (90%)	709 (90%)	653 (83%)
25–34	300	265 (88%)	246 (82%)	234 (78%)	213 (71%)
35–44	414	390 (94%)	369 (89%)	337 (81%)	274 (66%)
45+	625	628 (96%)	609 (93%)	563 (86%)	472 (72%)
Sex					
Male	806	744 (92%)	721 (89%)	691 (86%)	620 (77%)
Female	1,351	1 266 (94%)	1 281 (90%)	1 152 (85%)	992 (73%)
Marriage					
Not married	1,246	1 152 (92%)	1 117 (90%)	1 059 (85%)	931 (75%)
Married	911	858 (94%)	822 (90%)	784 (86%)	681 (75%)
Religion					
		*	**	*	**
Roman Catholic	225	206 (92%)	192 (85%)	187 (83%)	173 (77%)
Apostolic Sect	475	451 (95%)	432 (91%)	404 (85%)	340 (72%)
Pentecostal/ Protestant	754	690 (92%)	662 (88%)	629 (83%)	539 (71%)

Categories	Total	Number utilising HIV services (N) and Percent (%)			
		ART drug refill	Viral load monitoring	TB preventative Therapy	TB screening
Other religions	703	663 (94%)	653 (93%)	623 (89%)	560 (80%)
Education		*	**		**
Primary	492	470 (96%)	458(93%)	426 (87%)	349 (71%)
Secondary	1 426	1 318 (92%)	1 265 (89%)	1 203 (84%)	1 065 (75%)
Tertiary	129	116 (90%)	112 (87%)	114 (88%)	102 (79%)
Do not know/Did not attend school/No answer	110	106 (96%)	104 (95%)	100 (91%)	96 (87%)
Vaccinated for COVID-19		**	**	*	**
Yes	1 851	1 737 (94%)	1 683 (91%)	1 594 (86%)	1 405 (76%)
No	306	273 (89%)	256 (90%)	249 (81%)	207 (68%)
Need factors					
Pregnancy					
Yes	196	186 (94%)	177 (90%)	169 (86%)	151 (77%)
No	1155	1 080 (93%)	1 041 (90%)	983 (85%)	841 (73%)
Opportunistic Infection			**		**
Yes	247	235 (95%)	234 (95%)	220 (89%)	125 (87%)

Categories	Total	Number utilising HIV services (N) and Percent (%)			
		ART drug refill	Viral load monitoring	TB preventative Therapy	TB screening
No	1 910	1 775 (93%)	1 705 (89%)	1 623 (85%)	13.97 (75%)
COVID-19 Infection in the Past 24 Months					
Yes	315	289 (92%)	283 (90%)	273 (87%)	249 (79%)
No	1842	1 721 (93%)	1 656 (90%)	1 570 (85%)	1 363 (74%)
Contact of a COVID-19 Case					
Yes	417	389 (93%)	377 (90%)	356 (85%)	327 (78%)
No	1 740	1 621 (93%)	1 562 (90%)	1 487 (85%)	1 285 (73%)
Environmental Factors					
Residence		**	**	**	Ns
Rural	1374	1 309 (95%)	1 259 (92%)	1 199 (87%)	1 032 (75%)
Urban	783	701 (90%)	680 (87%)	644 (82%)	580 (74%)
Type of Health Facility		**	*		**
Central /Provincial facility	94	82 (87%)	83 (88%)	82 (87%)	53 (56%)
District health facility	556	546 (98%)	518 (93%)	490 (88%)	433 (78%)
Primary health care facility	1 507	1 382 (92%)	1 338 (89%)	1 271 (84%)	1 126 (75%)

**= p < 0.001, ** = p < 0.01, * = p < 0.05

4.3.3 Environmental factors

Residence had significant association with utilisation of ART drug refills, viral load monitoring and TB preventative therapy services. The study found higher proportions of utilisation across all four HIV services in rural areas as compared to urban areas in the COVID-19 restriction period. For ART drug refills there was 95% utilisation proportion in rural areas and 90% in urban areas. For viral load monitoring there was 92% utilisation proportion in rural areas and 87% in urban areas. For TB preventative therapy there was 87% utilisation proportion in rural areas and 82% in urban areas. In TB screening there was 75% utilisation proportion in rural areas and 74% in urban areas. In regard to type of health facility, there was significant association with utilisation of ART drug refills, viral load monitoring and TB screening services. The study found lower proportional utilisation in central/provincial health facilities to district health facilities and then primary health facilities in that order. Tuberculosis (TB) screening utilisation was 53% among people accessing services at central/provincial hospitals in comparison with 75% at primary health centres.

4.3.4 Enabling factors

The COVID-19 lockdown restrictions were noted as the major reason for not utilising all four HIV services as shown in Figure 5.1. For ART drug refills, distance to the health facility contributed 11% of the reason for HIV non-utilisation as it was the second majority reason after COVID-19 restrictions. For viral load monitoring, COVID-19 transport stoppages (11%) and fear of contracting COVID-19 (11%) were the second majority reasons after COVID-19 restrictions. For TB preventative therapy, fear of contracting COVID-19 (17%) and non-availability of community health workers during COVID-19 restrictions (7%) were the second and third majority reasons

after COVID-19 restrictions respectively. For TB screening, fear of contracting COVID-19 (19%) was the second majority reason after COVID-19 restrictions.

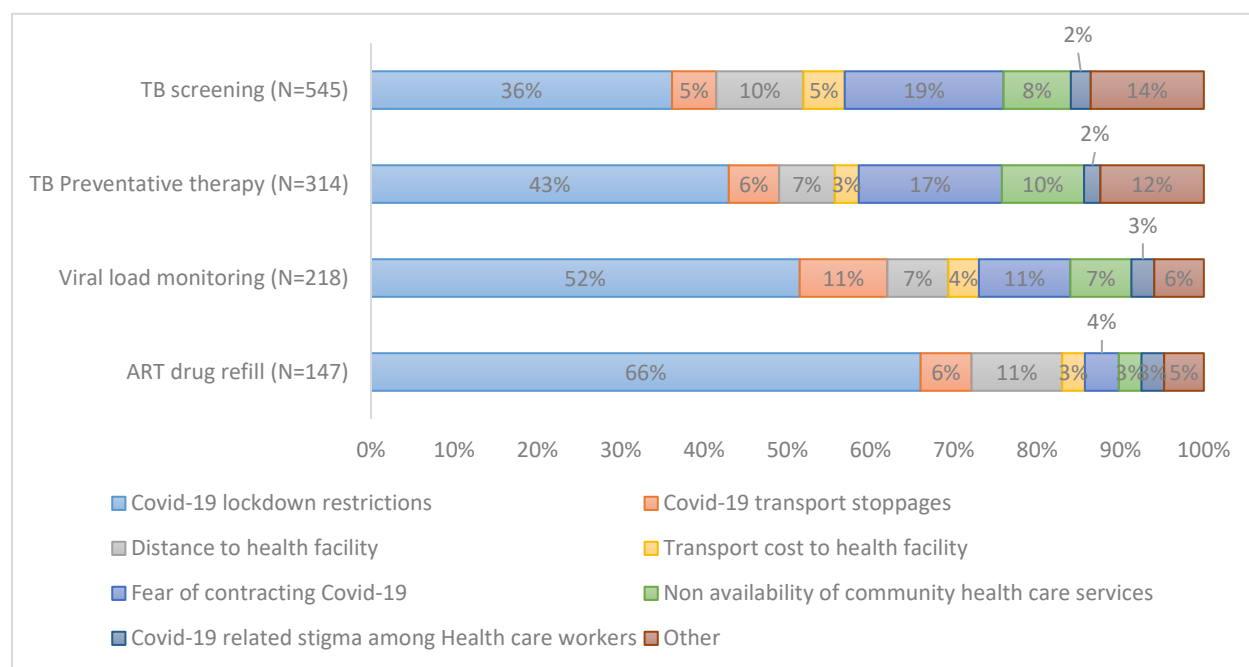


Figure 4.1: Enabling factors: Reasons for non-utilisation of HIV services among people living with HIV during COVID-19 restriction periods

In in-depth interviews with most key stakeholders (80%) it was apparent that some HIV services that used to be provided in the community were halted for different periods where COVID-19 cases were rife. Community services in which ART was delivered in households or community viral load monitoring were difficult to conduct in COVID-19 times. This therefore meant some people living with HIV who used to enjoy these community services had to resort to coming to the facility where there was fear contracting COVID-19. (Key informant interview)

The majority of the mentioned community services that were halted included community outreaches for dispensing ART and TB preventative therapy provision. This therefore led to missed appointments for some of those patients who were used to accessing their ART drug refills in the community through differentiated ART delivery models such as community ART drug refill groups and out of Facility Community ART Distribution.

In addition, although it was not an apparent finding in the quantitative section (<4%), most community volunteers in the qualitative in-depth interviews (60%) noted that there was some level of COVID-19 discrimination, particularly people living with HIV who came in with symptoms that related to TB which in most cases were similar to COVID-19 symptoms. It was not easy for people living with HIV to get screened for TB as it would seem like you have COVID-19 and have to be quickly quarantined and be cleared of COVID-19. (Interview with community volunteer)

CHAPTER FIVE: PREDICTORS OF UTILISATION OF HIV SERVICES

5.1 Introduction

This chapter goes on to provide in-depth insight into the utilisation of HIV services among people living with HIV through multivariate analysis of the predisposing, need, enabling and environmental factors. An account of the voices from qualitative interviews is also presented in this chapter.

5.2 Factors Associated with Utilisation of HIV Services During the COVID-19

Pandemic

5.2.1 ART drug refill utilisation

Under Model 1 which focused on predisposing factors only, multivariate analysis was done on age, sex, religion, marriage, education and being vaccinated for COVID-19 related to their association with attending ART drug refill appointments by people living with HIV. Model 1 revealed that adolescents and young people aged 15–24 (AOR = 1.84; 95% CI: 1.12–3.02), adults 35–44 (AOR = 2.01; 95% CI: 1.16–3.49), older adults 45+ (AOR = 3.16; 95% CI: 1.82–5.46) had higher odds of utilising ART drug refills compared to their counterparts who were aged 25–34 as reported in Table 5.1. Being a Pentecostal/Protestant (AOR = 0.60; 95% CI: 0.37–99) was significantly associated with less likelihood of utilising ART drug refills compared to the Apostolic Sect. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising the ART drug

refill service (AOR = 0.61; 95% CI: 0.40–0.94). Sex, marriage and education had no significant associations with ART drug refill utilisation among people living with HIV in Model 1.

Under Model 2 which focused on enabling factors only, multivariate analysis was done for COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services, COVID-19 related stigma among health care workers related to their association with attending ART drug refill appointments by people living with HIV. Distance to the health facility was significantly associated with higher odds of utilising the ART drug refill service (AOR = 2.48; 95% CI: 1.01–6.09). Fear of contracting COVID-19 among people living with HIV was significantly associated with higher odds of utilising the ART drug refill service (AOR = 4.86; 95% CI: 2.61–10.97). COVID-19 lockdown restrictions, COVID-19 transport stoppages, transport cost to health facility and non-availability of community health care services were not significantly associated with ART drug refill utilisation.

Under Model 3 which focused on need factors only, multivariate analysis was done for opportunistic infection in the past 24 months, COVID-19 infection in the past 24 months and contact with a COVID-19 case in the past 24 months related to their association with attending ART drug refill appointments by people living with HIV. All the need factors were not significantly associated with utilisation of ART drug refills. Under Model 4 which focused on environmental factors, being in a rural area was significantly associated with higher odds of utilising the ART drug refill service (AOR = 2.42; 95% CI: 1.70–3.44). Accessing health services at district health facilities was significantly associated with higher odds of accessing ART drug refills (AOR = 5.37; 95% CI: 2.22–12.98), than those accessing from central and provincial hospitals.

Table 5.0.1: Multivariate logistic regression analysis of utilisation of ART drug refills (E) among people living with HIV during COVID-19 restriction periods (Model 1-4)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Predisposing Factors (A)				
Age				
15-24	1.84 (1.12–3.02) *			
25-34	Ref	-	-	-
35-44	2.01 (1.16–3.49) *			
45+	3.16 (1.82–5.46) **			
Sex				
Male	0.81 (0.57–1.16)			
Female	Ref	-	-	-
Marital Status				
Not married	0.79 (0.54–1.18)			
Married	Ref	-	-	-
Religion				
Roman Catholic	0.61 (0.32–1.16)			
Apostolic Sect	Ref	-	-	-
Pentecostal/ Protestant	0.60 (0.37–0.99) *			
Other religions	0.91 (0.53–1.55)			

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Education				
Primary	1.53 (0.93–2.48)			
Secondary	Ref	-	-	-
Tertiary	0.81 (0.43–1.50)			
Do not know/Did not attend school/	1.92 (0.69–5.38)			
No Answer				
Vaccinated for COVID-19				
Yes	0.61 (0.40–0.94) *	-	-	-
No	Ref			
Need factors (C)				
Opportunistic Infection				
Yes	-	-	1.80 (0.93–3.49)	-
No			Ref	
COVID-19 Infection				
Yes	-	-	0.59 (0.33–1.03)	-
No			Ref	
Contact with a COVID-19 Case				
	-	-		

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Yes			1.16 (0.68–1.96)	-
No			Ref	
Environmental Factors (D)				
Residence				
Rural	-	-	-	2.42 (1.70–3.44) **
Urban				Ref
Type of health facility where HIV services are being accessed	-	-	-	
District health facility				5.37 (2.22–12.98) **
Central/Provincial health facility				Ref
Primary health care facility				1.02 (0.53–1.96)
Enabling Factors (B)				
COVID-19 lockdown restrictions		1.17 (0.62–2.22)		
COVID-19 transport stoppages		Ref		
Distance to health facility		2.48 (1.01–6.09) *		
Transport cost to health facility		2.51 (0.68–9.23)		

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Fear of contracting COVID-19		4.86 (2.16–10.97) **	-	-
Non-availability of community health care services		0.62 (0.22–1.70)		
COVID-19 related stigma among health care workers		0.98 (0.25–3.73)		
Other		1.97 (0.77– 5.00)		

*A=Predisposing factors, B=Enabling factors, C=Need factors, D=Environmental factors, E=Utilisation of HIV services

** = $p < 0.01$, * = $p < 0.05$, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

Model 5 focused on multivariate analysis of predisposing and enabling factors. Model 5 revealed that adolescents and young people aged 15–24 (AOR = 1.80; 95% CI: 1.09–2.98), adults 35–44 (AOR = 1.95; 95% CI: 1.12–3.41), older adults 45+ (AOR = 3.02; 95% CI: 1.74–5.24) had higher odds of utilising ART drug refills compared to their counterparts who were aged 25–34 as reported in Table 5.2. Being a Pentecostal/Protestant (AOR = 0.59; 95% CI: 0.36–0.97) was significantly associated with less likelihood of utilising ART drug refills compared to the Apostolic Sect. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising the ART drug refill service (AOR = 0.60; 95% CI: 0.40–0.94). Sex, marriage and education had no significant associations with ART drug refill utilisation among people living with HIV in Model 5. On the enabling factors, fear of contracting COVID-19 among people living with HIV was significantly associated with higher odds of utilising the ART drug refill service (AOR = 4.27; 95% CI: 1.87–

9.78). COVID-19 lockdown restrictions, COVID-19 transport stoppages, transport cost to health facility and non-availability of community health care services were not significant associated with ART drug refill utilisation.

Model 6 focused on the multivariate analysis of predisposing and need factors. Model 6 revealed that adolescents and young people aged 15–24 (AOR=1.93; 95% CI: 1.16–3.21), adults 35–44 (AOR=2.14; 95% CI: 1.23–3.73), older adults 45+ (AOR=3.24; 95% CI: 1.86–5.62) had higher odds of utilising ART drug refills compared to their counterparts who were aged 25–34 as reported in Table 5.2. Being a Pentecostal/Protestant (AOR=0.59; 95% CI: 0.36–0.97) was significantly associated with less likelihood of utilising ART drug refills compared to the Apostolic Sect. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising the ART drug refill service (AOR=0.61; 95% CI: 0.40–0.95). Sex, marriage and education had no significant associations with ART drug refill utilisation among people living with HIV in Model 6. On the need factors, all of them were not significantly associated with utilisation in model 6.

Model 7 focused on the multivariate analysis of predisposing factors and environmental factors. Model 7 revealed that adolescents and young people aged 15-24 (AOR=2.38; 95% CI: 1.42 – 3.99), adults 35-44 (AOR=2.05; 95% CI: 1.17 - 3.60), older adults 45+ (AOR=3.50; 95% CI: 2.00 – 6.14) had higher odds of utilising ART drug refills compared to their counterparts who were aged 25-34 as reported in Table 5.2. Being a Pentecostal/Protestant (AOR=0.58; 95% CI: 0.36 – 0.97) was significantly associated with less likelihood of utilising ART drug refills compared to the Apostolic Sect. Sex, marriage, COVID-19 vaccination and education had no significant associations with ART drug refill utilisation among people living with HIV in Model 7. On the environmental factors, residing in a rural area was significantly associated with higher odds of

utilising ART drug refills service (AOR=5.03; 95% CI: 1.97 – 12.81). Accessing services at district hospital AOR=5.09; 95% CI: 1.94 – 13.34) was significantly associated with higher odds of utilising ART drug refills service.

Table 5.0.2: Multivariate logistic regression analysis of utilisation of ART drug refills (E) among people living with HIV during COVID-19 restriction periods (Model 5-8)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Predisposing Factors (A)				
Age				
15-24	1.80 (1.09-2.98) **	1.93 (1.16-3.21) **	2.38 (1.42-3.99) **	2.31 (1.36-3.95) **
25-34	Ref			
35-44	1.95 (1.12-3.41) **	2.14 (1.23-3.73) *	2.05 (1.17-3.60) *	2.16 (1.21-3.88) **
45+	3.02 (1.74-5.24) **	3.24 (1.86-5.62) **	3.50 (2.00-6.14) **	3.25 (1.83-5.77) **
Sex				
Male	0.82 (0.58-1.19)	0.79 (0.55-1.13)	0.83 (0.58-1.19)	0.84 (0.58-1.22)
Female	Ref			
Marital Status				
Not married	0.76 (0.51-1.12)	0.80 (0.54-1.19)	0.81 (0.54-1.21)	0.78 (0.52-1.19)
Married	Ref			

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Religion				
Roman Catholic	0.63 (0.34-1.20)	0.61 (0.32-1.15)	0.62 (0.32-1.20)	0.65 (0.34-1.27)
Apostolic Sect	Ref			
Pentecostal/ Protestant	0.59 (0.36-0.97) **	0.59 (0.36-0.97) *	0.58 (0.36-0.97) *	0.55 (0.33-0.92) *
Other religions	0.97 (0.57-1.68)	0.91 (0.53-1.56)	0.95 (0.56-1.64)	1.02 (0.59-1.79)
Education				
Primary	1.50 (0.92-2.45)	1.46 (0.90-2.40)	1.21 (0.72-2.00)	1.16 (0.67-1.86)
Secondary	Ref			
Tertiary	0.95 (0.51-1.80)	0.84 (0.44-1.55)	0.78 (0.41-1.51)	0.94 (0.47-1.84)
Do not know/Did not attend school/	1.84 (0.65-5.19)	1.86 (0.67-5.22)	1.51 (0.53-4.30)	1.34 (0.46-3.90)
No answer				
Vaccinated for COVID-19				
Yes	0.60 (0.40-0.94) *	0.61 (0.40-0.95)**	0.69 (0.49-1.06)	1.47 (0.94-2.31)
No	Ref			

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Need Factors (C)				
Opportunistic Infection in the past 24 months				
Yes		1.90 (0.94- 3.81)		1.47 (0.73-2.98)
No	-		-	Ref
COVID-19 infection in the past 24 months				
Yes		0.60 (0.33-1.07)	-	0.71 (0.39-1.30)
No	-			Ref
Contact with a COVID-19 case in the past 24 months				
Yes	-	1.05 (0.60-1.84)		0.97 (0.54-1.72)
No			-	Ref
Environmental factors (D)				
Residence				
Rural	-	-	2.16 (1.50-3.13)**	2.19 (1.49-3.22) **
Urban				Ref

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Type of health facility				
District health facility			5.03 (1.97-12.81) *	5.09 (1.94-13.34) **
Central/Provincial health facility	-	-		Ref
Primary health care facility			0.86 (0.42-1.75)	0.78 (0.38-1.67)
Enabling factors (B)				
COVID-19 lockdown restrictions	1.04 (0.55-2.00)			0.99 (0.51-1.94)
COVID-19 transport stoppages	Ref			
Distance to health facility	2.11 (0.85-5.30)			2.01 (0.79-5.13)
Transport cost to health facility	2.73 (0.73-10.25)			2.86 (0.75-10.91)
Fear of contracting COVID-19	4.27 (1.87-9.78) **	-	-	4.27 (1.83-9.96) **
Non-availability of community health care services	0.58 (0.21-1.61)			0.35 (0.12-1.03)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
COVID-19 related stigma among Health care workers				
Other	0.98 (0.24-3.89)			1.22 (0.28-5.18)
	2.17 (0.84-5.60)			1.91 (0.73-5.02)

*A = Predisposing factors, B = Enabling factors, C = Need factors, D = Environmental factors, E = Utilisation of HIV services

** = $p < 0.01$, * = $p < 0.05$, Ref = Reference category, CI = Confidence Interval, AOR = Adjusted Odds Ratio

5.2.1.1 Full model on ART drug refills

The full model incorporated all predisposing, need, enabling and environmental factors. On predisposing factors, the study findings revealed that adolescents and young people aged 15–24 (AOR=2.31; 95% CI: 1.36–3.95), adults 35–44 (AOR=2.16; 95% CI: 1.21–3.88), older adults 35–44 (AOR=3.25; 95% CI: 1.83–5.77) had higher odds of utilising ART drug refills compared to their counterparts who were aged 25–34 as reported in Table 5.2. Being a Pentecostal/Protestant (AOR=0.55; 95% CI: 0.33–0.92) was significantly associated with less likelihood of utilising ART drug refills compared to the Apostolic Sect. Regarding environmental factors, being in a rural area was significantly associated with higher odds of utilising the ART drug refill service (AOR=2.19; 95% CI: 1.49–3.22). Accessing health services at district health facilities was significantly

associated with higher odds of accessing ART drug refills (AOR=5.09; 95% CI: 1.94–13.34) than those accessing from central and provincial hospitals. Regarding enabling factors, the fear of contracting COVID-19 was significantly associated with accessing ART drug refills (AOR=4.27; 95% CI 1.83–9.96) as compared to COVID-19 transport stoppages. Although COVID-19 transport shortages were not significant, it was mentioned as a challenge in in-depth interviews. People living with HIV would have still managed to accessed their HIV services but not with their routine transports as public transport was not easy to get. It was noted that it was difficult for people living with HIV outside Zimbabwe who access their ART in Zimbabwe in usually 6 monthly periods. This was so due to closure of borders and restrictions on movements.

5.2.2 Viral load monitoring utilisation

Under Model 1 which focused on predisposing factors only, multivariate analysis was done on age, sex, religion, marriage, education and being vaccinated for COVID-19 related to their association with utilising the viral load monitoring service by people living with HIV. Model 1 revealed that adolescents and young people aged 15–24 (AOR=2.26; 95% CI: 1.61–3.78), adults 35–44 (AOR=1.65; 95% CI: 1.07–2.55), older adults 45+ (AOR=2.76; 95% CI: 1.78–4.27) had higher odds of utilising viral load monitoring compared to their counterparts who were aged 25–34 as reported in Table 5.3. Being a Roman Catholic (AOR=0.60; 95% CI: 0.37–0.98) was significantly associated with less likelihood of utilising viral load monitoring compared to the Apostolic Sect. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising the viral load monitoring service (AOR=0.50; 95% CI: 0.35–0.72). Sex, marriage and education had no significant associations with viral load monitoring utilisation among people living with HIV in Model 1.

Under Model 2 which focused on enabling factors only, multivariate analysis was done for COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services and COVID-19 related stigma among health care workers related to their association with attending viral load monitoring appointments by people living with HIV. Fear of contracting COVID-19 among people living with HIV was significantly associated with higher odds of utilising the viral load monitoring service (AOR=2.45; 95% CI: 1.23–4.85). COVID-19 lockdown restrictions, distance to health facility, COVID-19 transport stoppages, transport cost to health facility and non-availability of community health care services were not significantly associated with viral load monitoring utilisation.

Under Model 3 which focused on need factors only, multivariate analysis was done for opportunistic infection in the past 24 months, COVID-19 infection in the past 24 months and contact with a COVID-19 case in the past 24 months related to their association with attending viral load monitoring appointments by people living with HIV. Opportunistic infections among people living with HIV was significantly associated with higher odds of utilising the viral load monitoring service (AOR=2.47; 95% CI: 1.33–4.59). Under Model 4 which focused on environmental factors, being in a rural area was significantly associated with higher odds of utilising the viral load monitoring service (AOR=1.72; 95% CI: 1.28–2.29).

Table 5.0.3: Multivariate logistic regression analysis of utilisation of viral load monitoring (E) among people living with HIV during COVID-19 restriction periods (Model 1-4)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Predisposing Factors (A)				
Age				
15-24	2.46 (1.61-3.78) **			
25-34	Ref	-	-	-
35-44	1.65 (1.07-2.55) *			
45+	2.76 (1.78-4.27) **			
Sex				
Male	0.86 (0.64-1.17)			
Female	Ref	-	-	-
Marital Status				
Not married	0.83 (0.60-1.15)			
Married	Ref	-	-	-
Religion				
Roman Catholic	0.60 (0.37-0.98) *			
Apostolic Sect	Ref	-	-	-

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Pentecostal/ Protestant	0.74 (0.51-1.11)			
Other religions	1.24 (0.80-1.92)			
Education				
Primary	1.65 (1.10-2.46)			
Secondary	Ref	-	-	-
Tertiary	0.82 (0.47-1.43)			
Do not know/Did not attend school/	1.82 (0.78-4.25)			
No answer				
Vaccinated for COVID-19				
Yes	0.50 (0.35-0.72) **	-	-	-
No	Ref			
Need Factors (C)				
Opportunistic Infection				
Yes	-	-	2.47 (1.33-4.59) **	-

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
No			Ref	
COVID-19 Infection				-
Yes	-	-	0.74 (0.46-1.22)	
No			Ref	
Contact with a COVID-19 Case				
Yes	-	-	1.01 (0.66-1.56)	
No			Ref	-
Environmental Factors (D)				
Residence				
Rural	-	-	-	1.72 (1.28-2.29) **
Urban				Ref
Type of health facility				
District health facility				1.38 (0.67-2.85)
Central/Provincial health facility	-	-	-	Ref

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Primary health care facility				0.77 (0.40-1.52)
Enabling Factors (B)				
COVID-19 lockdown restrictions		0.94 (0.52-1.74)		
COVID-19 transport stoppages		Ref		
Distance to health facility		1.51 (0.69-3.26)		
Transport cost to health facility		1.63 (0.55-4.79)		
Fear of contracting COVID-19		2.45 (1.23-4.85) *		-
Non-availability of community health care services	-	0.53 (0.22-1.28)		
COVID-19 related stigma among Health care workers		0.81 (0.24-2.71)		
Other		1.12 (0.52- 2.39)		

*A=Predisposing factors, B=Enabling factors, C=Need factors, D=Environmental factors, E=Utilisation of HIV services

** = p < 0.01, * = p < 0.05, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

Model 5 focused on multivariate analysis of predisposing factors and enabling factors. Model 5 revealed that adolescents and young people aged 15–24 (AOR=2.42; 95% CI: 1.56 – 3.74), adults 35–44 (AOR=1.56; 95% CI: 1.00–2.43), older adults 45+ (AOR=2.61; 95% CI: 1.68–4.07) had higher odds of utilising viral load monitoring compared to their counterparts who were aged 25–34 as reported in Table 5.4. Being a Roman Catholic (AOR=0.59; 95% CI: 0.36–0.98) was significantly associated with less likelihood of utilising viral load monitoring compared to the Apostolic Sect. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising the viral load monitoring service (AOR=0.60; 95% CI: 0.40–0.94). On education, people living with HIV in which primary education was the highest education attained (AOR=0.59; 95% CI: 0.36–0.98) was significantly associated with less likelihood of utilising viral load monitoring compared to those who had attained secondary education. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising the viral load monitoring service (AOR=0.48; 95% CI: 0.33–0.69). Sex and marriage had no significant associations with viral load monitoring utilisation among people living with HIV in Model 5. On the enabling factors, fear of contracting COVID-19 among people living with HIV was significantly associated with higher odds of utilising the viral load monitoring service (AOR=2.19; 95% CI: 1.08–4.42). COVID-19 lockdown restrictions, COVID-19 transport stoppages, transport cost to health facility and non-availability of community health care services were not significant associated with viral load monitoring utilisation.

Model 6 focused on the multivariate analysis of predisposing and need factors. Model 6 revealed that adolescents and young people aged 15–24 (AOR=2.78; 95% CI: 1.79–4.32), adults 35–44 (AOR=1.82; 95% CI: 1.17–2.84), older adults 45+ (AOR=2.97; 95% CI: 1.91– 4.62) had higher

odds of utilising viral load monitoring compared to their counterparts who were aged 25–34 as reported in Table 5.4. Being a Roman Catholic (AOR=0.60; 95% CI: 0.36–0.99) was significantly associated with less likelihood of utilising viral load monitoring compared to the Apostolic Sect. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising the viral load monitoring service (AOR=0.54; 95% CI: 0.37–0.77). Sex, marriage and education had no significant associations with viral load monitoring utilisation among people living with HIV in Model 6. On the need factors, opportunistic infections (AOR=1.48; 95% CI: 1.09–2.01) were associated with higher odds of viral load utilisation among people living with HIV.

Model 7 focused on the multivariate analysis of predisposing and environmental factors. Model 7 revealed that adolescents and young people aged 15–24 (AOR=2.82; 95% CI: 1.81–4.40), adults 35–44 (AOR=1.67; 95% CI: 1.08–2.60), older adults 45+ (AOR=2.91; 95% CI: 1.87–4.53) had higher odds of utilising viral load monitoring compared to their counterparts who were aged 25–34 as reported in Table 5.4. Being a Pentecostal/Protestant (AOR=0.60; 95% CI: 0.36–0.97) was significantly associated with less likelihood of utilising viral load monitoring compared to the Apostolic Sect. Being vaccinated for COVID-19 (AOR=0.54; 95% CI: 0.37–0.77) was significantly associated with less likelihood of utilising viral load monitoring compared to the unvaccinated. Sex, marriage and education had no significant associations with viral load monitoring utilisation among people living with HIV in Model 7. On the environmental factors, residing in a rural area was significantly associated with higher odds of utilising the viral load monitoring service (AOR=1.48; 95% CI: 1.09–2.01).

Table 5.0.4: Multivariate logistic regression analysis of utilisation of viral load monitoring (E) among people living with HIV during COVID-19 restriction periods (Model 5-8)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Predisposing factors (A)				
Age				
15-24	2.42 (1.56-3.74) **	2.78 (1.79-4.32) **	2.82 (1.81-4.40) **	3.06 (1.93-4.85) **
25-34	Ref			
35-44	1.56 (1.00-2.43) **	1.82 (1.17-2.84) **	1.67 (1.08-2.60) *	1.77 (1.12-2.78) *
45+	2.61 (1.68-4.07) **	2.97 (1.91-4.62) **	2.91 (1.87-4.53) **	2.92 (1.86-4.60) **
Sex				
Male	0.87 (0.65-1.19)	0.81 (0.60-1.09)	0.87 (0.64-1.18)	0.82 (0.60-1.12)
Female	Ref			
Marital Status				
Not married	0.82 (0.60-1.13)	0.84 (0.61-1.16)	0.83 (0.60-1.15)	0.83 (0.60-1.12)
Married	Ref			
Religion				
Roman Catholic	0.59 (0.36-0.98) **	0.57 (0.34-0.95) *	0.60 (0.36-0.99) *	0.58 (0.35-0.96) *

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Apostolic sect	Ref			
Pentecostal/ Protestant	0.72 (0.49-1.07)	0.72 (0.49-1.08)	0.74 (0.49-1.10)	0.71 (0.47-1.06)
Other religions	1.28 (0.82-1.99)	1.22 (0.79-1.90)	1.28 (0.82-1.99)	1.31 (0.84-2.06)
Education				
Primary	1.60 (1.07-2.40) *	1.53 (1.03-2.30) *	1.45 (0.96-2.18)	1.27 (0.83-1.94)
Secondary	Ref			
Tertiary	0.93 (0.53-1.63)	0.82 (0.47-1.43)	0.77 (0.44-1.37)	0.90 (0.51-1.61)
Do not know/Did not attend school/	1.74 (0.74-4.09)	1.72 (0.73-4.04)	1.58 (0.67-3.72)	1.41 (0.59-3.34)
No answer				
Vaccinated for COVID-19				
Yes	0.48 (0.33-0.69) **	1.93 (0.36-0.74)**	0.54 (0.37-0.77)*	1.93 (1.33-2.82)**
No	Ref			
Need Factors (C)				

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Opportunistic Infection				
-	-			
Yes		2.84 (1.48- 5.45) **		2.64 (1.36- 5.19) **
No		Ref	-	
COVID-19 infection				
Yes		0.79(0.47-1.31)		0.87 (0.52-1.45)
No	-	Ref	-	
Contact with a COVID-19 Case				
Yes	-	0.91 (0.58-1.44)		0.87 (0.55-1.38)
No		Ref	-	
Environmental Factors (D)				
Residence				
Rural	-	-	1.48 (1.09-2.01) *	1.20 (1.10-2.09)*

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Urban			Ref	
Type of health facility where HIV services are being accessed				
District health facility	-		1.50 (0.69-3.27)	1.42 (0.65-3.15)
Central/Provincial health facility	-		Ref	
Primary health care facility			0.74 (0.37-1.50)	0.73 (0.35-1.49)
Enabling Factors (B)				
COVID-19 lockdown restrictions	0.81 (0.43-1.51)			0.82 (0.44-1.54)
COVID-19 transport stoppages	Ref			
Distance to health facility	1.21 (0.54-2.69)			1.31 (0.58-2.94)
Transport cost to health facility	1.47(0.49-4.42)			1.49 (0.49-4.56)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Fear of contracting COVID-19	2.19 (1.08-4.42) **	-	-	2.36 (1.16-4.79) *
Non-availability of community health care services	0.51 (0.21-1.26)			0.43 (0.17-1.07)
COVID-19 related stigma among Health care workers	0.69 (0.20-2.38)			0.65 (0.19-2.30)
Other	1.09 (0.50-2.36)			1.01 (0.46- 2.21)

*A=Predisposing factors, B=Enabling factors, C=Need factors, D=Environmental factors, E=Utilisation of HIV services

** = p < 0.01, * = p < 0.05, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

5.2.2.1 Full model on viral load monitoring

The full model incorporated all predisposing, need, enabling and environmental factors. On predisposing factors, the study findings revealed that adolescents and young people aged 15–24 (AOR=3.06; 95% CI: 1.93–4.85), adults 35–44 (AOR=1.77; 95% CI: 1.12–2.78), older adults 35–44 (AOR=2.92; 95% CI: 1.86–4.60) had higher odds of utilising viral load monitoring compared to their counterparts who were aged 25–34 as presented in Table 5.4. Being a Roman Catholic (AOR=0.58; 95% CI: 0.35–0.96) was significantly associated with less likelihood of utilising viral load monitoring compared to the Apostolic Sect. Being vaccinated for COVID-19 was

significantly associated with higher odds of utilising the viral load monitoring service (AOR=1.93; 95% CI: 1.33–2.82) than those not yet vaccinated.

Regarding need factors, having an opportunistic infection in the COVID-19 restriction periods was significantly associated with higher odds of accessing viral load monitoring (AOR=2.64; 95% CI: 1.36–5.19) than those who did not have an opportunistic infection. Regarding environmental factors, being in a rural area was significantly associated with higher odds of utilising viral load monitoring (AOR=1.20; 95% CI: 1.10–2.09) than their urban counterparts. Regarding enabling factors, the fear of contracting COVID-19 was significantly associated with accessing viral load monitoring (AOR=2.36; 95% CI 1.16–4.79) as compared to COVID-19 transport stoppages.

5.2.3 TB preventative therapy utilisation

Under Model 1 which focused on predisposing factors only, multivariate analysis was done on age, sex, religion, marriage, education and being vaccinated for COVID-19 related to their association with attending the TB preventative therapy service by people living with HIV. Model 1 revealed that adolescents and young people aged 15–24 (AOR=3.01; 95% CI: 2.03–4.46) and older adults 45+ (AOR=1.68; 95% CI: 1.16–2.40) had higher odds of utilising TB preventative therapy compared to their counterparts who were aged 25–34 as reported in Table 5.5. Being not married (AOR=0.67; 95% CI: 0.51–0.87) was significantly associated with less likelihood of utilising TB preventative therapy compared to their married counterparts. Being a Pentecostal/Protestant (AOR=0.94; 95% CI: 0.66–0.25) was significantly associated with less likelihood of utilising TB preventative therapy compared to the Apostolic Sect. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising the TB preventative therapy service

(AOR=0.61; 95% CI: 0.43–0.85). Sex and education had no significant associations with TB preventative therapy utilisation among people living with HIV in Model 1.

Under Model 2 which focused on enabling factors only, multivariate analysis was done for COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services and COVID-19 related stigma among health care workers related to their association with attending TB preventative therapy appointments by people living with HIV. Fear of contracting COVID-19 among people living with HIV was significantly associated with higher odds of utilising the TB preventative therapy service (AOR=1.99; 95% CI: 1.12–3.52). Non-availability of community health workers was significantly associated with lesser odds of utilising the TB preventative therapy service (AOR=0.34; 95% CI: 0.17–0.69). COVID-19 lockdown restrictions, distance to health facility, COVID-19 transport stoppages and transport cost to health facility were not significantly associated with TB preventative therapy utilisation.

Under Model 3 which focused on need factors only, multivariate analysis was done for opportunistic infection in the past 24 months, COVID-19 infection in the past 24 months and contact with a COVID-19 case in the past 24 months related to their association with attending TB preventative therapy appointments by people living with HIV. All need factors were not associated with utilisation of TB preventative therapy. Under Model 4 which focused on environmental factors, all need factors were not associated with utilisation of TB preventative therapy.

Table 5.0.5: Multivariate logistic regression analysis of utilisation of TB preventative therapy (E) among people living with HIV during COVID-19 restriction periods (Model 1-4)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Predisposing Factors (A)				
Age				
15-24	3.01 (2.03-4.46) **			
25-34	Ref	-	-	-
35-44	1.13 (0.66-1.16)			
45+	1.68 (1.16-2.40) **			
Sex				
Male	0.85 (0.66-1.12)			
Female	Ref	-	-	-
Marital Status				
Not married	0.67 (0.51-0.87) **			
Married	Ref	-	-	-
Religion				
Roman Catholic	0.88 (0.56-1.36)			
Apostolic Sect	Ref	-	-	-

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Pentecostal/ Protestant	0.94 (0.66-0.25) *			
Other religions	1.24 (0.87-1.78)			
Education				
Primary	1.32 (0.97-1.80)			
Secondary	Ref	-	-	-
Tertiary	1.25 (0.71-2.21)			
Do not know/Did not attend school/	1.57 (0.80-3.09)			
No answer				
Vaccinated for COVID-19				
Yes	0.61 (0.43-0.85) *	-	-	-
No	Ref			
Need Factors (C)				
Opportunistic Infection in the Past 24 Months				
Yes	-	-	1.47 (0.94-2.34)	-

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
No			Ref	
COVID-19 infection in the past 24 months				
	-	-		-
Yes			1.07 (0.69-1.65)	
No			Ref	
Contact of a COVID-19 case in the past 24 months				
	-	-		
Yes			0.87 (0.61-1.25)	-
No			Ref	
Environmental Factors (D)				
Residence				
Rural	-	-	-	1.55 (1.21-2.00) **
Urban				Ref
Type of health facility where HIV services are being accessed				
District health facility	-	-	-	0.87 (0.44-1.70)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Central/Provincial health facility				Ref
Primary health care facility				0.61 (0.32-1.17)
Enabling Factors (B)				
COVID-19 lockdown restrictions		1.28 (0.76-2.18)		
COVID-19 transport stoppages		Ref		
Distance to health facility		1.11 (0.61-2.06)		
Transport cost to health facility		0.92 (0.42-2.03)		-
Fear of contracting COVID-19			-	
Non-availability of community health care services		1.99 (1.12-3.52) *		
COVID-19 related stigma among health care workers	-	0.34 (0.17-0.69) **		
		0.97 (0.35-2.68)		

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Other		1.79 (0.95- 3.38)		

*A=Predisposing factors, B=Enabling factors, C=Need factors, D=Environmental factors, E=Utilisation of HIV services

** = $p < 0.01$, * = $p < 0.05$, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

Model 5 focused on multivariate analysis of predisposing factors and enabling factors. Model 5 revealed that adolescents and young people aged 15–24 (AOR=2.83; 95% CI: 1.89–4.24) and older adults 45+ (AOR=1.61; 95% CI: 1.12–2.33) had higher odds of utilising TB preventative therapy compared to their counterparts who were aged 25–34 as reported in Table 5.6. Being not married (AOR=0.64; 95% CI: 0.49–0.85) was significantly associated with less likelihood of utilising TB preventative therapy compared to the married. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising TB preventative therapy service (AOR=0.59; 95% CI: 0.42–0.84). On the enabling factors, fear of contracting COVID-19 among people living with HIV was also significantly associated with higher odds of utilising TB preventative therapy service (AOR=2.19; 95% CI: 1.08–4.42). Non-availability of community health care was significantly

associated with higher odds of utilising TB preventative therapy service (AOR=0.41; 95% CI: 0.20–0.83). COVID-19 lockdown restrictions, COVID-19 transport stoppages and transport cost to health facility were not significant associated with TB preventative therapy utilisation.

Model 6 focused on multivariate analysis of predisposing and need factors. Model 6 revealed that adolescents and young people aged 15–24 (AOR=3.27; 95% CI: 2.19–4.89) and older adults 45+ (AOR=1.76; 95% CI: 1.22–2.54) had higher odds of utilising TB preventative therapy compared to their counterparts who were aged 25–34 as reported in Table 5.6. Being not married was significantly associated with lesser odds of utilising TB preventative therapy service (AOR=0.67; 95% CI: 0.50–0.88). Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising TB preventative therapy service (AOR=0.61; 95% CI: 0.44–0.85). Sex, religion and education had no significant associations with TB preventative therapy utilisation among people living with HIV in Model 6. On the need factors, opportunistic infections (AOR=1.48; 95% CI: 1.09–2.01) were associated with higher odds of viral load utilisation among people living with HIV.

Table 5.0.6: Multivariate logistic regression analysis of utilisation of TB preventative therapy (E) among people living with HIV during COVID-19 restriction periods (Model 5-8)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Predisposing Factors (A)				

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Age				
15-24	2.83 (1.89-4.24) **	3.27 (2.19-4.89) **	3.36 (2.24-5.04) **	3.37 (2.21-5.13) **
25-34	Ref			
35-44	1.10 (0.75-1.61)	1.19 (0.81-1.73)	1.13 (0.77-1.65)	1.16 (0.78-1.70)
45+	1.61 (1.12-2.33) **	1.76 (1.22-2.54) **	1.73 (1.20-2.29) **	1.74 (1.19-2.53) **
Sex				
Male	0.88 (0.67-1.14)	0.82 (0.63-1.06)	0.85 (0.65-1.11)	0.84 (0.64-1.10)
Female	Ref			
Marital Status				
Not married	0.64 (0.49-0.85) **	0.67 (0.50-0.88) **	0.66 (0.50-0.87) **	0.65 (0.49-0.85) **
Married	Ref			
Religion				
Roman Catholic	0.89 (0.56-1.39)	0.85 (0.55-1.32)	0.90 (0.58-1.40)	0.88 (0.56-1.39)
Apostolic sect	Ref			
	0.90 (0.64-1.24)	0.89 (0.64-1.23)	0.91 (0.65-1.26)	0.89 (0.63-1.24)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Pentecostal/ Protestant	1.28 (0.89-1.83)	1.22 (0.86-1.75)	1.29 (0.90-1.84)	1.31 (0.92-1.89)
Other religions				
Education				
Primary	1.34 (0.98-1.83)	1.27 (0.93-1.72)	1.16 (0.84-1.59)	1.11 (0.80-1.54)
Secondary	Ref			
Tertiary	1.43 (0.79-2.56)	1.24 (0.70-2.20)	1.21 (0.65-1.26)	1.36 (0.75-2.46)
Do not know/Did not attend school/	1.54 (0.77-3.04)	1.50 (0.76-2.97)	1.37(0.90-1.84)	1.26 (0.63-2.53)
No answer				
Vaccinated for COVID-19				
Yes	0.59 (0.42-0.84) *	0.61 (0.44-0.85)**	0.65 (0.46-0.91)*	1.59 (1.13-2.26)**
No	Ref			
Need Factors (C)				

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Opportunistic Infection in the Past 24 Months				
Yes	-	1.69 (1.05- 2.73) *	-	1.53 (0.94-2.48)
No		Ref		
COVID-19 Infection in the Past 24 Months				
Yes	-	1.12 (0.72-1.74)		1.15 (0.74-1.80)
No		Ref	-	
Contact with a COVID-19 Case in the Past 24 Months				
Yes	-	0.84 (0.58-1.22)		0.76 (0.52-1.11)
No		Ref	-	
Environmental Factors (D)				
Residence				

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Rural	-		1.49 (1.14-1.94) *	1.58 (1.20-2.09)**
Urban		-	Ref	
Type of health facility where HIV services are being accessed	-	-		
District health facility			1.30 (0.64-2.67)	1.14 (0.55-3.97)
Central/Provincial health facility			Ref	
Primary health care facility			0.76 (0.39-1.49)	0.63 (0.32-1.26)
Enabling Factors (B)				
COVID-19 lockdown restrictions	1.29 (0.75-2.22)			1.34 (0.77-2.31)
COVID-19 transport stoppages	Ref			
Distance to health facility	1.18 (0.63-2.21)			1.20 (0.63-2.27)
Transport cost to health facility	0.90 (0.40-2.01)			0.92 (0.41-2.07)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)
Fear of contracting COVID-19	2.21 (1.23-3.95) **	-	-	2.38 (1.32-4.30) **
Non-availability of community health care services	0.41 (0.20-0.83) **			0.35 (0.17-0.72) **
COVID-19 related stigma among health care workers	1.21 (0.42-3.46)			1.44 (0.49-4.18)
Other	1.90 (0.99-3.65)			1.85 (0.98-3.56)

*A=Predisposing factors, B=Enabling factors, C=Need factors, D=Environmental factors, E=Utilisation of HIV services

** = $p < 0.01$, * = $p < 0.05$, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

Model 7 focused on the multivariate analysis of predisposing and environmental factors. Model 7 revealed that adolescents and young people aged 15–24 (AOR=3.36; 95% CI: 2.24–5.04) and older adults 45+ (AOR=1.73; 95% CI: 1.20–2.29) had higher odds of utilising TB preventative therapy compared to their counterparts who were aged 25–34 as reported in Table 5.6. Being unmarried (AOR=0.66; 95% CI: 0.50–0.88) was significantly associated with less likelihood of utilising TB preventative therapy compared to the Apostolic Sect. Being vaccinated for COVID-19 (AOR=0.65; 95% CI: 0.46–0.91) was significantly associated with less likelihood of utilising TB preventative therapy compared to the unvaccinated. Sex, marriage and education had no significant

associations with TB preventative therapy utilisation among people living with HIV in Model 7. On the environmental factors, residing in a rural area was significantly associated with higher odds of utilising the TB preventative therapy service (AOR=1.489; 95% CI: 1.14–1.94).

5.2.3.1 Full model TB preventative therapy

The full model incorporated all predisposing, need, enabling and environmental factors. On predisposing factors, the study findings revealed that adolescents and young people aged 15-24 (AOR=3.37; 95% CI: 1.21–5.13) and older adults 35-44 (AOR=1.74; 95% CI: 1.19–2.53) had higher odds of utilising TB preventative therapy compared to their counterparts who were aged 25-34. Being unmarried (AOR=0.65; 95% CI: 0.49–0.85) was significantly associated with less probability of utilising TB preventative therapy compared to the married counterparts. Being vaccinated for COVID-19 was significantly associated with higher odds of utilising TB preventative therapy (AOR=1.59; 95% CI: 1.13–2.26) than those not yet vaccinated.

Regarding environmental factors, being in a rural area was significantly associated with higher odds of utilising TB preventative therapy (AOR=1.58; 95% CI: 1.10 - 2.09) their urban counterparts. Regarding enabling factors, the fear of contracting COVID-19 was significantly associated with accessing TB preventative therapy (AOR=2.38; 95% CI 1.32-4.30) as compared to COVID-19 transport stoppages. Non-availability of community health care services during COVID-19 restriction period was significantly associated with less likelihood of accessing TB preventative therapy (AOR=0.35; 95% CI 0.17-0.72).

5.2.4 Utilisation of TB screening services

Under Model 1 which focus on predisposing factors only, multivariate analysis was done on age, sex, religion, marriage, education and being vaccinated for COVID-19 as it related to their association in attending TB screening service by people living with HIV. Model 1 revealed that adolescents and young people aged 15-24 (AOR=2.13; 95% CI: 1.52 – 3.01) had higher odds of utilising TB screening compared to their counterparts who were aged 25-34 as reported in Table 5.7. Being not married (AOR=0.72; 95% CI: 0.57 – 0.89) was significantly associated with less likelihood of utilising TB screening compared to their married counterparts. Being in Other religions (AOR=1.40; 95% CI: 1.06 – 1.86) was significantly associated with higher likelihood of utilising TB screening compared to the Apostolic Sect. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising TB screening service (AOR=0.61; 95% CI: 0.43 – 0.85). Sex and education had no significant associations with TB screening utilisation among people living with HIV in Model 1.

Under Model 2 which focused on enabling factors only, multivariate analysis was done for COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services, COVID-19 related stigma among health care workers as it related to their association in attending TB screening appointment by people living with HIV. Fear of contracting COVID-19 among people living with HIV was significantly associated with higher odds of utilising TB screening service (AOR=1.92; 95% CI: 1.21 – 3.03). COVID-19 lockdown restrictions, distance to health facility, COVID-19 transport stoppages, non-availability of

community health workers, transport cost to health facility were not significant associated with TB screening utilisation.

Under Model 3 which focused on need factors only, multivariate analysis was done for opportunistic infection in the past 24 months, COVID-19 infection in the past 24 months, Contact of a COVID-19 case in the past 24 months as it related to their association in attending TB screening appointment by people living with HIV. Opportunistic infections were significantly associated with utilising TB screening service (AOR=2.44; 95% CI: 1.61 – 3.70). Under Model 4 which focused on environmental factors, central/provincial health facility (AOR=2.79; 95% CI: 1.74 – 4.45) and primary health care facility (AOR=2.34; 95% CI: 1.50 – 3.64) was significantly associated with higher odds of utilisation of TB screening.

Table 5.0.7: Multivariate logistic regression analysis of utilisation of TB screening (E) among people living with HIV during COVID-19 restriction periods (Model 1-4)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Predisposing Factors (A)				
Age				
15-24	2.13 (1.52-3.01) **			
25-34	Ref	-	-	-
35-44	0.72 (0.52-1.00)			
45+	0.99 (0.73-1.36)			

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Sex				
Male	1.01 (0.82-1.25)			
Female	Ref	-	-	-
Marital Status				
Not married	0.72 (0.57-0.89) **			
Married	Ref	-	-	-
Religion				
Roman Catholic	1.36 (0.93-1.98)			
Apostolic Sect	Ref	-	-	-
Pentecostal/ Protestant	1.02 (0.78-1.31)			
Other religions	1.40 (1.06-1.86) *			
Education				
Primary	0.96 (0.75-1.23)			
Secondary	Ref	-	-	-
Tertiary	1.06 (0.67-1.66)			
Do not know/Did not attend school/	2.14 (1.19-3.84) *			

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
No answer				
Vaccinated for COVID-19				
Yes	0.52 (0.39-0.69) *	-	-	-
No	Ref			
Need Factors (C)				
Opportunistic Infection				
Yes	-	-	2.44 (1.61-3.70*)	-
No			Ref	
COVID-19 Infection				
Yes	-	-	0.95 (0.66-1.36)	-
No			Ref	
Contact with a COVID-19 Case in the Past 24 Months				
Yes	-	-	1.07 (0.78-1.45)	
			Ref	-

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
No				
Environmental Factors (D)				
Residence				
Rural	-	-	-	0.96 (0.77-1.18)
Urban				Ref
Type of health facility				
District health facility				2.79 (1.74-4.45) **
Central/Provincial health facility	-	-	-	Ref
Primary health care facility				2.34 (1.50-3.64) **
Enabling factors (B)				
COVID-19 lockdown restrictions		1.42 (0.92-2.19)		
COVID-19 transport stoppages		Ref		
Distance to health facility		0.73 (0.44-1.20)		

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 1 (A+E)	Model 2 (B+E)	Model 3 (C+E)	Model 4 (D+E)
Transport cost to health facility		0.78 (0.42-1.44)		-
Fear of contracting COVID-19		1.92 (1.21-3.03) *	-	
Non-availability of community health care services	-	0.88 (0.46-1.72)		
COVID-19 related stigma among health care workers		1.32 (0.62-2.86)		
Other		1.39 (0.83- 2.33)		

*A=Predisposing factors, B=Enabling factors, C=Need factors, D=Environmental factors, E=Utilisation of HIV services

** = $p < 0.01$, * = $p < 0.05$, Ref = Reference category, CI= Confidence Interval, AOR= Adjusted Odds Ratio

Model 5 focused on multivariate analysis of predisposing factors and enabling factors. Model 5 revealed that adolescents and young people aged 15-24 (AOR=2.15; 95% CI: 1.51 – 3.06), had higher odds of utilising TB screening compared to their counterparts who were aged 25-34 as reported in Table 5.8. However, those and adults 35-44 (AOR=0.66 95% CI: 0.47 – 0.91), had lesser odds of utilising TB screening. Being not married (AOR=0.71; 95% CI: 0.60 – 0.89) was significantly associated with less likelihood of utilising TB screening compared to the married. Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising TB screening service (AOR=0.59; 95% CI: 0.42 – 0.84). Those in other religions were significantly

associated with higher odds of utilising TB screening service (AOR=1.41; 95% CI: 1.06 – 1.88). Those in Do not know/Did not attend school/No answer were significantly associated with higher odds of utilising TB screening service (AOR=2.17; 95% CI: 1.20 – 3.94). On the enabling factors, fear of contracting COVID-19 among people living with HIV was also significantly associated with higher odds of utilising TB screening service (AOR=2.42; 95% CI: 1.51 – 3.89). COVID-19 lockdown restrictions, COVID-19 transport stoppages, non-availability of community health care services, transport cost to health facility, were not significant associated with TB screening utilisation.

Model 6 focused on multivariate analysis of predisposing factors and need factors. Model 6 revealed that adolescents and young people aged 15-24 (AOR=2.52; 95% CI: 1.77 – 3.57), had higher odds of utilising TB screening compared to their counterparts who were aged 25-34 as reported in Table 5.8. Being in other religions was significantly associated with higher odds of utilising TB screening service (AOR=1.42; 95% CI: 1.07 – 1.89). Those in Do not know/Did not attend school/No answer were significantly associated with higher odds of utilising TB screening service (AOR=2.03; 95% CI: 1.12 – 3.65).

Being vaccinated for COVID-19 was significantly associated with lesser odds of utilising TB screening service (AOR=0.54; 95% CI: 0.41 – 0.72). Sex and religion had no significant associations with TB screening utilisation among people living with HIV in Model 6. On the need factors, opportunistic infections (AOR=2.83; 95% CI: 1.85 – 4.33). were associated with higher odds of viral load utilisation among people living with HIV.

Model 7 focused on multivariate analysis of predisposing factors and environmental factors. Model 7 revealed that adolescents and young people aged 15-24 (AOR=2.70 95% CI: 1.89 – 3.86).

However, the 35-44 age band was significantly associated with less likelihood of utilisation of the TB screening service (AOR=0.70; 95% CI: 0.50 – 0.96). Other religions (AOR=0.72; 95% CI: 0.57 – 0.90) had higher odds of utilising TB screening compared to Apostolic Sect. Being an unmarried (AOR=1.36; 95% CI: 1.02 – 1.81) was significantly associated with less likelihood of utilising TB screening compared to the Apostolic Sect. Being a vaccinated for COVID-19 (AOR=0.53; 95% CI: 0.39 – 0.71) was significantly associated with less likelihood of utilising TB screening compared to the unvaccinated. Sex, marriage, and education had no significant associations with TB screening utilisation among people living with HIV in Model 7. On the environmental factors, accessing services at district health facility (AOR=5.11; 95% CI: 3.03 – 8.63). and Primary health care (AOR=3.38; 95% CI: 2.09 – 5.47). was significantly associated with higher odds of utilising TB screening service.

Table 5.0.8: Multivariate logistic regression analysis of utilisation of TB screening (E) among people living with HIV during COVID-19 restrictions periods (Model 5-8)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)				
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model (A+B+C+D+E)	
Predisposing Factors (A)					
Age					
15-24	2.15 (1.51-3.06) **	2.52 (1.77-3.57) **	2.70 (1.89-3.86) *	3.18 (2.08-4.38) **	
25-34	Ref				
35-44	0.66 (0.47-0.91) **	0.79 (0.57-1.11)	0.70 (0.50-0.96) *	0.70 (0.50-0.98) *	

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)			
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8 Full Model
	(A+B+C+D+E)			
45+	0.91 (0.66-1.24)	1.08 (0.79-1.48)	0.98 (0.72-1.35)	0.96 (0.69-1.33)
Sex				
Male	1.04 (0.83-1.30)	0.91 (0.73-1.14)	1.01 (0.82-1.26)	0.95 (0.76-1.19)
Female	Ref			
Marital Status				
Not married	0.71 (0.60-0.89) **	0.72 (0.57-0.91)	0.72 (0.57-0.90) **	0.73 (0.58-0.91)**
Married	Ref			
Religion				
Roman Catholic	1.29 (0.88-1.89)	1.34 (0.92-1.97)	1.29 (0.88-1.90)	1.25 (0.84-1.85)
Apostolic Sect	Ref			
Pentecostal/ Protestant	0.99 (0.76-1.28)	1.01 (0.77-1.32)	0.97 (0.74-1.27)	0.96 (0.73-1.26)
Other religions	1.41 (1.06-1.88) *	1.42 (1.07-1.89) *	1.36 (1.02-1.81) *	1.39 (1.04-1.86) *
Education				
Primary	1.03 (0.80-1.32)	0.90 (0.70-1.15)	0.98 (0.76-1.25)	0.96 (0.75-1.25)
Secondary	Ref			
Tertiary	1.13 (0.71-1.80)	1.04 (0.66-1.64)	1.17 (0.73-1.88)	1.25 (0.78-2.03)

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)				
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8	Full
	Model (A+B+C+D+E)				
Do not know/Did not attend school/	2.17 (1.20-3.94) *	2.03 (1.12-3.65) *	1.82 (1.01-3.30)	1.80 (0.98-3.28)	
No answer					
Vaccinated for COVID-19	0.50 (0.37-0.67)	0.54 (0.41-0.72)**	0.53 (0.39-0.71)**	1.89 (1.40-2.52)**	
Yes	Ref				
No					
Need factors (C)					
Opportunistic Infection in the Past 24 Months					
Yes	-	2.83 (1.85- 4.33) **	-	2.67 (1.73-4.12)**	
No		Ref			
COVID-19 Infection in the Past 24 Months					
Yes		0.98 (0.68-1.40)		1.03 (0.72-1.49)	
No	-	Ref	-		
Contact with a COVID-19 Case in the Past 24 Months					

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)				
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8	Full
				Model	Model
				(A+B+C+D+E)	
Yes	-	1.09 (0.79-1.48)		1.03 (0.75-1.41)	
No		Ref	-		
Environmental Factors (D)					
Residence					
Rural	-		0.97 (0.77-1.23)	1.04 (0.82-1.31)	
Urban		-	Ref		
Type of health facility where HIV services are being accessed					
District health facility	-		5.11 (3.03-8.63) *	3.97 (2.31-6.84) **	
Central/Provincial health facility		-	Ref		
Primary health care facility			3.38 (2.09-5.47) *	2.96 (1.80-4.87) **	
Enabling Factors (B)					

Categories	Adjusted Odds Ratio (AOR) and 95% Confidence Intervals (CI)				
	Model 5 (A+B+E)	Model 6 (A+C+E)	Model 7 (A+D+E)	Model 8	Full
				Model	Model
				(A+B+C+D+E)	
COVID-19 lockdown restrictions	1.49 (0.95-2.33)			1.32 (0.84-2.09)	
COVID-19 transport stoppages	Ref				
Distance to health facility	0.84 (0.49-1.42)			0.91 (0.53-1.55)	
Transport cost to health facility	0.75 (0.39-1.44)			0.83 (0.43-1.60)	
Fear of contracting COVID-19	2.42 (1.51-3.89) **	-	-	2.32 (1.43-3.77) **	
Non-availability of community health care services	1.10 (0.55-2.19)			1.01 (0.50-2.05)	
COVID-19 related stigma among Health care workers	1.61 (0.73-3.58)			1.36 (0.60-3.05)	
Other	1.49 (0.88-2.54)			1.36 (0.79-2.33)	

*A=Predisposing factors, B=Enabling factors, C=Need factors, D=Environmental factors, E=Utilisation of HIV services

** = p < 0.01, * = p < 0.05, Ref = Reference category, CI= Confidence Interval, AOR= Adjusted Odds Ratio

5.2.4.1 Full model on utilisation of TB screening

The full model incorporated all predisposing, need, enabling and environmental factors. On predisposing factors, the study findings revealed that adolescents and young people aged 15–24 (AOR=3.18; 95% CI: 2.08–4.38) had higher odds of utilising TB screening services compared to their counterparts who were aged 25–34. However, adults (AOR=0.70; 95% CI: 0.50–0.98) were less likely to utilise TB screening services compared to their counterparts aged 25–34. People living with HIV who were not married (AOR=0.73; 95% CI: 0.58–0.91) were less likely to utilise TB screening compared to their married counterparts. Other religions (AOR=1.36; 95% CI: 1.04–1.86) were associated with utilising TB screening compared to the Apostolic Sect. Being vaccinated for COVID-19 was significantly associated with higher odds of utilisation of the TB screening services (AOR=1.89; 95% CI: 1.40–2.26) than those not yet vaccinated.

Regarding need factors, having an opportunistic infection in the COVID-19 restriction periods was significantly associated with higher likelihood of TB screening (AOR=2.67; 95% CI: 1.73–4.12) than those who did not have an opportunistic infection. Accessing health services at district health facilities was significantly associated with higher odds of accessing TB screening (AOR=3.97; 95% CI: 2.31–6.84) than those accessing at central and provincial hospitals. Accessing health services at primary health facilities was significantly associated with higher odds of accessing TB screening (AOR=2.96; 95% CI: 1.80–4.87) than those accessing at central and provincial hospitals. Regarding enabling factors, the fear of contracting COVID-19 was significantly associated with TB screening (AOR=2.32; 95% CI 1.43–3.77) as compared to COVID-19 transport stoppages.

Multivariate analysis showed that people living in the rural areas were more like to utilise HIV services than those in the urban areas. Qualitative findings also brought up the issue of residence

as an important factor for utilisation of HIV services after the advent of COVID-19 by people living with HIV. Sixty percent of the key informants were of the view that this was more likely as people in rural areas would have had less interruptions to accessing their routine HIV services as opposed to people in the urban areas.

There was less number of COVID-19 cases in rural areas compared to urban areas, COVID-19 was heavily urban hence the utilisation challenges followed suit. (Key informant interview).

In-depth interviews gave reasons such as overcrowding in urban areas as the major drivers of HIV utilisation challenges after the advent of COVID-19. Multivariate analysis showed opportunistic infections as significant in defining utilisation of ART drug refills, viral load and TB screening. Similarly, in the qualitative findings, 50% of community volunteers felt that opportunistic infections that happened during the COVID-19 pandemic period were also an important factor in pushing less people living with HIV to access HIV services as their health facilities were nursing COVID-19 patients.

At the peak of the COVID-19 pandemic it was not easy to make to your ART drug refill appointment, at your hospital that you know many COVID-19 patients are being taken care of. In most cases if you had an opportunistic infection you will be forced to take on the risk. (Community volunteer in-depth interview)

Hence with in this instance opportunistic infection became a push factor to ensure HIV services are utilised as noted by the community volunteers. The fear of contracting COVID-19 had high likelihood of utilisation of HIV services in the multivariate analysis across all four targeted HIV services. In the qualitative in-depth interviews, 70% of community volunteers felt that there was a fear among people living with HIV that COVID-19 infection may have more severe outcomes.

People living with HIV did not want anything that will lead to compromising their immune system.

(Community volunteer in-depth interview)

Hence there was a push was to ensure that all HIV services were always met and they remained immune strong against COVID-19 if affected. Multivariate analysis also showed that being vaccinated for COVID-19 was significantly associated with utilisation of viral load services, TB screening and TB preventative therapy. Key informants explained this by noting that people living with HIV who usually meet their service appointments were more likely to be vaccinated for COVID-19.

However, all in-depth and key informant interviews did not find religion as having had an influence on access to HIV services during the COVID-19 period. Also, the community volunteers did not find sex a factor that influenced utilisation of HIV services among people living with HIV after the advent of COVID-19.

Predisposing factors Age: <i>“Adolescents living with HIV less than the age of 19 usually need more adherence support from support groups among other activities which were stopped in the COVID-19 pandemic peak days. Hence its possible they were interruption in treatment among this age group”</i> (key informant interview). Sex: <i>“Usually females are more likely to meet their ART refill appointments more than men. This something that should have planned for considering the COVID-19 barriers”</i> (Community volunteer in-depth interview). Sex: <i>“It depends on the community probably. I do not think gender dynamics played much in influencing accessing HIV services”</i> (Key informant in-depth interview). Education: <i>“Well, I can say the more you are exposed to the lessor you would listen to fake news that was easily available during the pandemic days that would impede how to routinely utilize their HIV services...”</i> Vaccinated for COVID-19: <i>“That COVID-19 vaccinated were less afraid of visiting the facilities to access HIV</i>	
Need factors Opportunistic infections: <i>“Some opportunistic infections were push factors to utilization of HIV services. This would ignite targeted viral load testing for example”</i> (Key informant interview) Contact of COVID-19 case: <i>“Being a contact raised so much fear that would push for ensuring that as much as possible all HIV services are accessed...”</i> Community volunteer in-depth interview	Enabling factors COVID lockdown restrictions: <i>“For those in which their appointments need public transport, it was difficult to tell the police roadblock that you travelling to access your refill drug whilst others listen”</i> (Community volunteer in-depth interview) Non availability of community health workers <i>“As community health volunteers we could do our adherence support activities, which in turn led to some people miss their routine Art drug refills...”</i>
Residence: <i>“Rural people utilized HIV services more since the effect of COVID-19 was far less as compared to urban areas”</i> (Community volunteer in-depth interview) Residence: <i>Urban areas generally have more health service utilization barriers, that include transportation costs, user fees among others, which not much in rural areas. Hence even in the COVID-19 season the situation gets worse...”</i>	

Figure 5.1: What factors have influenced continued utilization of HIV services since the outbreak of COVID-19? Selected factor responses from in-depth interviews

5.3 Generalized structural equation (GSEM) modelling

The generalized structural equation (GSEM) modelling approach was also applied to the factors which were significant in the full model above. Regarding accessing ART refills, the GSEM showed that residence, type of health facility and age were significantly associated with utilization of the service. Regarding accessing viral load monitoring, the GSEM showed that residence, type of health facility, Covid-19 vaccination and opportunistic infections were significantly associated with utilization of the service. Regarding accessing TB preventative therapy, the GSEM showed that residence, type of health facility, Covid-19 vaccination and religion were significantly associated with utilization of the service. Regarding accessing TB screening, the GSEM showed that age and Covid-19 vaccination were significantly associated with utilization of the service.

Table 5.0.9 GSEM for ART drug refill

Variable	Coefficient	ART drug refill		
		OIM Standard Error	P value	95% Confidence Interval
Residence	-0.06	0.12	0.00*	0.82-0.04
Type of Health facility	-0.03	0.01	0.001*	0.53-0.14
Age	0.01	0.04	0.025*	0.001-0.02
Sex	0.01	0.11	0.35	0.01-0.03
Marital Status	0.004	0.11	0.71	0.02-0.03
Religion	0.006	0.01	0.26	0.004-0.02
Covid-19 vaccination	-0.03	0.15	0.56	0.06-0.0007
Opportunistic Infections	0.0004	0.17	0.98	0.33-0.03

Table 5.10 GSEM for Viral load monitoring

Variable	Viral load monitoring			
	Coefficient	OIM Standard Error	P value	95% Confidence Interval
Residence	-0.05	0.13	0.001*	0.07-0.019
Type of Health facility	-0.03	0.01	0.02*	0.05-0.004
Age	0.006	0.005	0.29	0.005-0.02
Sex	0.008	0.01	0.52	0.02-0.04
Marital Status	0.006	0.01	0.68	0.03-0.21
Religion	0.10	0.006	0.003*	0.006-0.03
Covid-19 vaccination	-0.06	0.02	0.001*	0.09-0.003
Opportunistic Infections	0.038	0.02	0.07	0.08-0.003

Table 5.11 GSEM for TB Preventative therapy

Variable	TB preventative therapy			
	Coefficient	OIM Standard Error	P value	95% Confidence Interval
Residence	-0.06	0.16	0.00	0.09-0.03
Type of Health facility	-0.04	0.01	0.009*	0.64-0.09
Age	0.02	0.006	0.003*	0.03-0.07
Sex	0.004	0.02	0.80	0.03-0.04
Marital Status	0.019	0.16	0.23	0.01-0.06
Religion	0.02	0.007	0.03*	0.0008-0.03
Covid-19 vaccination	-0.05	0.02	0.02*	0.09-0.007
Opportunistic Infections	0.03	0.02	0.26	0.08-0.02

Variable	Coefficient	TB screening		
		OIM Standard Error	P value	95% Confidence Interval
Residence	-0.002	0.02	0.90	0.04-0.04
Type of Health facility	-0.03	0.02	0.05	0.00-0.06
Age	0.05	0.01	0.00*	0.07-0.03
Sex	0.005	0.02	0.78	0.04-0.03
Marital Status	0.02	0.02	0.26	0.02-0.06
Religion	0.01	0.01	0.15	0.004-0.03
Covid-19 vaccination	-0.11	0.03	0.00*	0.16-0.0.54
Opportunistic Infections	-0.16	0.03	0.00	0.21-0.099

5.4 Hypotheses Testing

This section presents the results of the tests of the hypotheses for this study. Four hypotheses were tested to investigate the association between predisposing, need, enabling and environmental factors in the utilisation of HIV services after the advent of COVID-19 in Zimbabwe. The Chi-square test and multivariate logistic regression were employed to test the hypotheses. The significance of the relationship was tested by examining the p-value corresponding to the estimated odd ratios, with the p-value set at 95% significance level ($\alpha=0.05$).

5.4.1 Background to the hypotheses

This study had four hypotheses which were premised on the Anderson health utilisation model. Using Anderson's health care utilisation model, the hypothesis sought to test if predisposing, enabling, environmental and need factors increased the odds of utilisation of HIV treatment services after the advent of the COVID-19 pandemic in Zimbabwe. A number of these studies showed that the predisposing, need and enabling factors are critical in defining utilisation of health services (Pengid et al., 2022; Seidu, 2020; Tolera et al., 2020). In Ethiopia, predisposing, enabling and need factors increased the odds of utilisation of antenatal services (Tolera et al., 2020). In Ghana, predisposing, enabling and need factors increased the odds of utilisation of HIV testing (Seidu, 2020). In the COVID-19 setting, this was also applied in Brazil where predisposing, enabling, disabling and need factors increased the odds of COVID-19 testing (Pengid et al., 2022). Thus in this study, the same hypotheses were applied to test if these Anderson health model utilisation factors increased the odds of utilising services during the COVID-19 pandemic in Zimbabwe.

In the first hypothesis I hypothesised that predisposing factors, that include age, sex, marriage, religion, education, COVID-19 vaccination higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe. In the second hypothesis I hypothesised enabling factors including COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services, COVID-19 related stigma among health care workers) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the

COVID-19 period in Zimbabwe. In the third hypothesis I hypothesised that need factors including pregnancy during the Covid19 period, opportunistic infection during COVID-19 period, COVID-19 infection and contact of COVID-19 case) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe. In the fourth hypothesis I hypothesised that environmental factors including residence and type of health facility are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

5.4.2 Hypothesis one

5.4.2.1 Null and alternative hypothesis

H₀: Predisposing factors (age, sex, marriage, religion, education, COVID-19 vaccination) are not associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

H₁: Predisposing factors (age, sex, marriage, religion, education, COVID-19 vaccination) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

5.4.2.2 Results of hypothesis one

Regarding bivariate associations as presented in Table 2 in Chapter Four and summarised in Table 15 below, age was statistically significant for utilisation of ART drug refills, viral load, TB preventative therapy and TB screening services among people living with HIV. Religion was also

statistically significant for utilisation of ART drug refills, viral load, TB preventative therapy and TB screening. Education was statistically significant for utilisation of ART drug refills, viral load and TB screening. Being vaccinated for COVID-19 was also statistically significant for accessing ART drug refills, viral load, TB preventative therapy and TB screening services among the people living with HIV. However, marriage and sex were not significantly associated with utilisation of HIV services after the advent of COVID-19.

Table 5.0.12: Predisposing factors bivariate associations

Significant at 0.05 for one or more HIV services	Non-significant for all HIV services
Age	Sex
Religion	Marriage
Education	
COVID-19 vaccination	

Regarding multivariate associations as presented in Chapter Four and summarised in Table 8.1 the utilisation of ART drug refill services was significantly associated with ages 15–24, 35–44, 45+, and being Pentecostal/Protestant. On utilisation of viral load monitoring services ages 15–24, 35–44, 45+, being Roman Catholic and being vaccinated were significantly associated. On utilisation of TB preventative therapy, ages 15–24, 35–44, 45+, being adult male 25+ on comparison between adolescents and young people and adults, being unmarried and being vaccinated for COVID-19

were significantly associated. On TB screening services, ages 15–24 and 35–44, being unmarried, being in other religions and being vaccinated were significantly associated.

Table 5.0.13 Predisposing factors multivariate associations

Predisposing factor	HIV services with significant variable associations at multivariate analysis among people who are living with HIV on ART(at 95% Confidence Interval)			
	ART drug refill	Viral load monitoring	TB preventative therapy	TB screening
Age	Ages 15-24, 35-44, 45+	Ages 15-24, 35-44, 45+	Ages 15-24, 35-44, 45+	Ages 15-24 and 35-44
Sex	-	-	Being Adult 25+ male on comparison between adolescents and young people and adults	-
Marital status	-	-	Being unmarried	Being unmarried
Religion	Being Pentecostal/Protestant	Being Roman Catholic	-	Being in other religions
Education	-	-	-	-
Vaccinated for COVID-19	-	Being vaccinated	Being vaccinated	Being vaccinated

In qualitative findings factors like age were confirmed in the interviews, adolescents living with HIV less than the age of 19 usually need more adherence support from support groups among other activities which were stopped in the COVID-19 pandemic peak days. Hence its possible they were interruption in treatment among this age group.

Decision: The results of this hypothesis test imply that predisposing factors (age, sex, marriage, religion, education, COVID-19 vaccination) had significant interactions in defining the utilisation

of HIV services in the advent of COVID-19. Henceforth, there is enough evidence to accept hypothesis one. [Not rejected]

5.4.3 Hypothesis two

5.4.3.1 Null and alternative hypothesis two

H₀: Enabling factors (COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services, COVID-19 related stigma among health care workers) are not associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

H₁: Enabling factors (COVID-19 lockdown restrictions, COVID-19 transport stoppages, distance to health facility, transport cost to health facility, fear of contracting COVID-19, non-availability of community health care services, COVID-19 related stigma among health care workers) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

5.4.3.2 Results of hypothesis two

Regarding enabling factors, distance to health facility was statistically significant to utilisation of ART drug refills among adults aged 25+. Transport cost to health facility was statistically significant to utilisation of ART drug refills as well. Fear of contracting COVID-19 was statistically significant across utilisation of ART drug refills, viral load monitoring, TB preventative therapy and TB screening. Non-availability of community health services was

statistically significant for accessing viral load services among adults aged 25+ and also for TB preventative therapy.

Table 5.0.14: Enabling factors multivariate associations

Enabling factor	HIV services with significant variable associations at multivariate analysis among people who are living with HIV on ART(at 95% Confidence Interval)			
	ART drug refill	Viral load monitoring	TB preventative therapy	TB screening
COVID-19 lockdown restrictions				
COVID-19 transport stoppages				
Distance to health facility	only among adults 25+			
Transport cost to health facility				
Fear of contracting COVID-19				
Non-availability of community health care services		only among adults 25+		
COVID-19 related stigma among health care workers				

*Shaded areas were significant at multivariate analysis

Qualitative finding confirmed that due to COVID lockdown restrictions for users of public transport, it was difficult to tell the police at roadblock that you were travelling to access your refill drug.

Decision: The results of this hypothesis test imply that enabling factors had no adequate significant interactions in defining the utilisation of HIV services in the advent of COVID-19. Henceforth, there is not enough evidence to accept hypothesis two. **[rejected]**

5.4.4 Hypothesis three

5.4.4.1 Null and alternative hypothesis

H₀: Need factors (pregnancy during the COVID-19 period, opportunistic infection during COVID-19 period, COVID-19 infection, contact with COVID-19 case) are not associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

H₁: Need factors (pregnancy during the COVID-19 period, opportunistic infection during COVID-19 period, COVID-19 infection, contact with COVID-19 case) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

5.3.4.2 Results of hypothesis two

Regarding need factors, having an opportunistic infection in the COVID-19 restriction periods was significantly associated with higher odds of accessing viral load monitoring and TB screening.

Table 5.0.15 Need factors bivariate and multivariate associations

Significant at bivariate association	Significant at multivariate association
Opportunistic infection during COVID-19 period	Opportunistic infection during COVID-19 period

Non-significant at bivariate association	Non-significant at multivariate association
Pregnancy during the COVID-19 period, COVID-19 infection and contact with COVID-19 case	Pregnancy during the COVID-19 period, COVID-19 infection and contact with COVID-19 case

In qualitative findings Opportunistic infections were noted as push factors to utilization of HIV services. On the other hand being a contact of COVID-19 case raised fear that would push for ensuring that as much as possible all HIV services are accessed.

Decision: The results of this hypothesis test imply that need factors had no adequate significant interactions in defining the utilisation of HIV services after the advent of COVID-19. Henceforth, there is no enough evidence to accept hypothesis three. **[rejected]**

5.4.5 Hypothesis four

5.4.5.1 Null and Alternative hypothesis

H₀: Environmental factors (residence (urban/rural) and type of health facility) are not associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

H₁: Environmental factors (residence (urban/rural) and type of health facility) are associated with higher likelihood of utilisation of HIV treatment services among people who are living with HIV on ART during the COVID-19 period in Zimbabwe.

5.4.5.2 Results of hypothesis four

Residence and type of health facility was statistically significant at bivariate analysis and also in the below services in Table 5.13 at multivariate analysis.

Table 5.0.16: Environmental factors bivariate and multivariate associations

Environmental factor	HIV services with significant variable associations at multivariate analysis among people who are living with HIV on ART(at 95% Confidence Interval)			
	ART drug refill	Viral load monitoring	TB preventative therapy	TB screening
Residence	Being in a rural area	Being in a rural area	Being in a rural area	-
Type of health facility	Accessing services at district health facility	-	-	Accessing services at district health facility Accessing services at primary health facility

Qualitative findings also confirmed that Rural people utilized HIV services more since the effect of COVID-19 was far less as compared to urban areas.

Decision: The results of this hypothesis test imply that environmental factors had adequate significant interactions in defining the utilisation of HIV services after the advent of COVID-19. Henceforth, there is enough evidence to accept hypothesis four. **[Not rejected]**

CHAPTER SIX: PREDICTORS OF UTILISATION OF HIV SERVICES DIFFERENCES BY AGE

6.1 Introduction

This chapter describes the differences in the predictors of continued utilisation of HIV care treatment services during the COVID-19 outbreak among adolescents and young people (15–24) and adults (25+) living with HIV on antiretroviral therapy. It is divided into the four HIV services: ART drug refill, viral load monitoring, TB preventative therapy and TB screening.

6.2 ART Drug Refill Utilisation by Age Among People Living with HIV

Among people living with HIV (n=2 157), the study found a higher proportion of utilisation of ART drug refills among adults 25+ which was 94% (1283/1366) in comparison to adolescents and young people which was 91% (727/791). Table 6.1 shows the differences in ART drug refill utilisation by predisposing, need and environmental factors. Concerning predisposing factors, there were significant differences on sex ($\chi^2=63.53$, $p=0.00$), marital status ($\chi^2=296.05$, $p=0.00$), religion ($\chi^2=90.51$, $p=0.00$) and education ($\chi^2=197.46$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to ART drug refills. Concerning need factors, there were significant differences on opportunistic infection in the past 24 months ($\chi^2=54.28$, $p=0.00$), COVID-19 infection in the past 24 months ($\chi^2=27.35$, $p=0.00$) and contact with a COVID-19 case in the past 24 months ($\chi^2=38.34$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to ART drug refills. Concerning environmental factors, there were significant differences on residence ($\chi^2=40.65$, $p=0.00$) and type

of health facility ($\chi^2=215.14$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to ART drug refills.

Table 6.0.1: Differences in ART drug refill utilisation by age among people living with HIV

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Predisposing Factors					
Sex					
Male	378	352 (93%)	428	392 (92%)	**
Female	413	375 (91%)	938	891 (95%)	x ² =63.53 (p=0.00)
Marital Status					
Not married	658	600 (91%)	588	552 (93%)	**
Married	133	127 (95%)	778	731 (94%)	x ² =296.05 (p=0.00)
Religion					
Roman Catholic	78	71 (91%)	147	135 (92%)	**
Apostolic Sect	123	114 (93%)	352	337 (96%)	x ² =90.51 (p=0.00)
Pentecostal/ Protestant	243	209 (86%)	511	481 (94%)	
Other religions	347	333 (96%)	356	330 (93%)	
Education					

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Primary	65	64 (98%)	427	406 (95%)	
Secondary	579	527 (91%)	847	791 (93%)	
Tertiary	83	75 (90%)	46	41 (89%)	**
Do not know/Did not attend/No answer	64	61 (95%)	46	45 (97%)	$\chi^2=197.46$ (p=0.00)
Vaccinated for COVID-19					
Yes	602	556 (92%)	1 249	1 131 (91%)	**
No	189	171 (90%)	117	93 (79%)	$\chi^2=90.99$ (p=0.00)
Need Factors					
Pregnancy in the past 24 months					
Yes	59	55 (93%)	137	131 (96%)	$\chi^2=0.01$ (p=0.94)
No	354	320 (90%)	801	760 (95%)	
Opportunistic infection in the past 24 months					
Yes	35	34 (97%)	212	201 (95%)	
No					

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
	756	693 (96%)	1,154	1 082 (93%)	**
					$\chi^2=54.28$ (p=0.00)
COVID-19 Infection					
Yes	72	65 (90%)	243	224 (92%)	**
No	719	662 (92%)	1 123	1 059 (94%)	$\chi^2=27.35$ (p=0.00)
Contact with a COVID-19 Case					
Yes	97	88 (91%)	320	301 (94%)	**
No	694	639 (92%)	1 046	982 (94%)	$\chi^2=38.34$ (p=0.00)
Environmental Factors					
Residence					
Rural	443	408 (92%)	931	901 (97%)	**
Urban	348	319 (92%)	435	382 (88%)	$\chi^2=40.65$ (p=0.00)
Type of Health Facility					

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Central /Provincial health facility	78	69 (88%)	16	13 (81%)	**
District health facility	80	78 (98%)	476	468 (98%)	x ² =215.14 (p=0.00)
Primary health care facility	633	580 (92%)	874	802 (91%)	

** = p < 0.01, * = p < 0.05

Figure 6.1 shows the differences in proportion of enabling factors as reasons for not utilising ART drug refills among adolescents and young people (15–24) and adults (25+). Concerning the enabling factors, COVID-19 lockdown restrictions were mentioned as the main reason that contributed to non-utilisation of ART drug refills in both adolescents and young people (15–24) and adults (25+). However, the proportion was higher in adults (70%) compared to 61% in adolescents and young people. Distance to the health facility was the second highest reason for non-utilisation of ART drug refills with 16% in adolescents and young people compared to 7% in adults. Fear of contracting COVID-19 had a relatively higher proportion among adults compared to adolescents (2%) and 6% among adults.

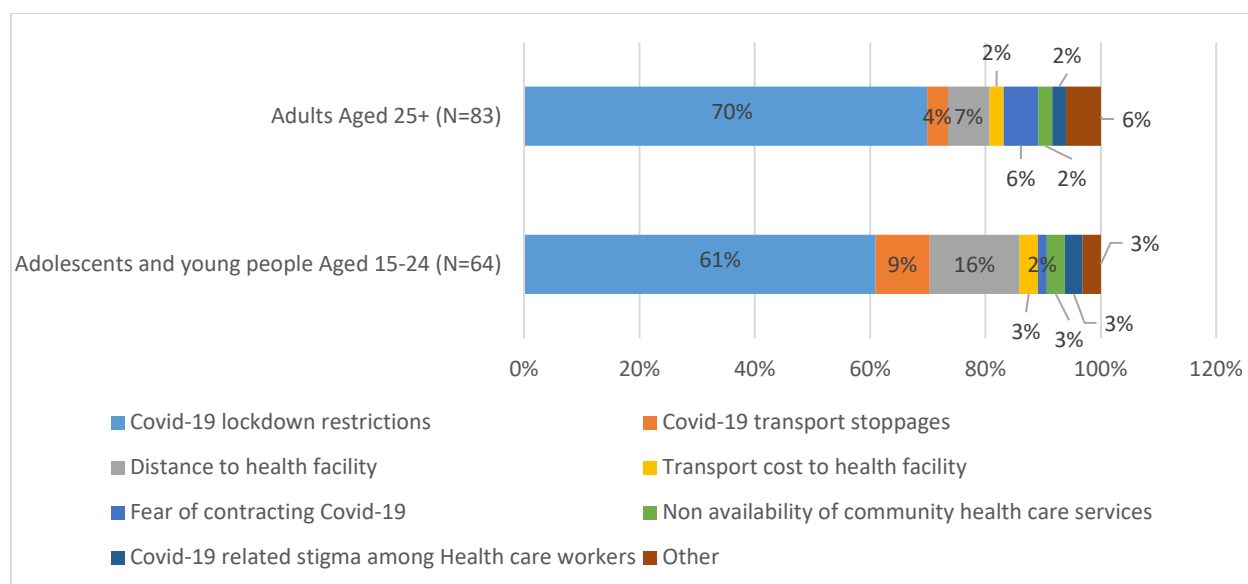


Figure 6.1: Enabling factors: Comparison of reasons for not accessing ART drug refills among adolescents and young people (15–24) and adults (25+)

Table 6.2 represents the multivariate analysis of differences in ART drug refill utilisation by age. Regarding predisposing factors, among adults, being male was significantly associated with lesser odds of ART drug refill utilisation (AOR=0.53; 95% CI: 0.31–0.90) in comparison with females. This was however not significant in adolescents and young people (AOR=1.40; 95% CI: 0.79–2.46). Being Pentecostal/Protestant was significantly associated with lesser odds of ART drug refill utilisation (AOR=0.32; 95% CI: 0.14–0.75) among adolescents and young people in comparison with the Apostolic Sect. This was however not significant in adults (AOR=0.66; 95% CI: 0.32–1.31). Regarding environmental factors, adults residing in a rural area was significantly associated with higher odds of ART drug refills among people living with HIV (AOR=3.97; 95% CI: 2.28–6.92) in comparison with their urban counterparts. However, among adolescents and young people there was no significant association (AOR=1.25; 95% CI: 0.67–2.37).

Table 6.0.2: Multivariate analysis of differences in ART drug refill utilisation by age

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1,366	
	AOR	95% CI	AOR	95% CI
Predisposing factors				
Sex				
Male	1.40	0.79-2.46	0.53	0.31-0.90*
Female	Ref			
Marital Status				
Not married	0.79	0.48-1.31	1.16	0.77-1.74
Married	Ref			
Religion				
Roman Catholic	1.01	0.34-2.97	0.67	0.27-1.59
Apostolic Sect	Ref			
Pentecostal/ Protestant	0.32	0.14-0.75**	0.66	0.32-1.31
Other religions	1.71	0.68-4.27	0.69	0.33-1.40
Education				
Primary	7.73	0.99-59.94	0.69	0.38-1.26
Secondary	Ref			
Tertiary	1.18	0.46-3.01	0.76	0.25-2.33
Did not attend school/Do not know/No answer	1.98	0.54-7.17	1.51	0.18-12.41

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1,366	
	AOR	95% CI	AOR	95% CI
COVID-19 vaccinated				
Yes	1.23	0.65-2.32	1.71	0.86-3.40
No	Ref			
Need factors				
Opportunistic infection in the past 24 months				
Yes	2.71	0.33-22.02	1.31	0.59-2.90
No	Ref			
COVID-19 infection in the past 24 months				
Yes	0.94	0.28-3.10	0.56	0.27-1.18
No	Ref			
Contact of a COVID-19 case in the past 24 months				
Yes	0.94			
No	Ref	0.32-2.78	0.84	0.41-1.71
Environmental factors				
Residence				
Rural	1.25	0.67-2.37	3.97	2.28-6.92**

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1,366	
	AOR	95% CI	AOR	95% CI
Urban	Ref			
Type of health facility where HIV services are being accessed				
Central/Provincial health facility	Ref	0.80-22.39	14.88	2.78-79.59**
District health facility	4.24	0.25-1.91	2.48	
Primary health care facility	0.70			0.55-11.14
Enabling Factors				
COVID-19 lockdown restrictions	1.45	0.59-3.54	0.68	0.22-2.12
COVID-19 transport stoppages	Ref			
Distance to health facility	1.23	0.40-3.81	7.04	0.73-67.70
Transport cost to health facility	10.28	1.14-92.40*	1.19	0.17-7.93
Fear of contracting COVID-19	6.06	1.83-20.02**	3.65	0.96-13.84
Non-availability of community health care services	0.96	0.15-6.00	0.21	0.05-1.01
COVID-19 related stigma among Health care workers	0.74	0.03-15.18	1.49	0.22-9.84
Other	-	-	0.29	0.76-1.13

** = p < 0.01, * = p < 0.05, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

6.3 Viral Load Monitoring Utilisation by Age Among People Living with HIV

Among people living with HIV (n=2 157), the study found the same proportion of utilisation of viral load monitoring among adults 25+ which was 90% (1224/1366) in comparison to adolescents and young people which was 90% (715/791). Table 6.3 shows the differences in viral load monitoring utilisation by predisposing, need and environmental factors. Concerning predisposing factors, there were significant differences on sex ($\chi^2=57.99$, $p=0.00$), marital status ($\chi^2=294.30$, $p=0.00$), religion ($\chi^2=85.72$, $p=0.00$) and education ($\chi^2=185.92$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to viral load monitoring. Concerning need factors, there were significant differences on opportunistic infection in the past 24 months ($\chi^2=59.28$, $p=0.00$), COVID-19 infection in the past 24 months ($\chi^2=27.35$, $p=0.00$) and contact with a COVID-19 case in the past 24 months ($\chi^2=31.89$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to viral load monitoring. Concerning environmental factors there were significant differences on residence ($\chi^2=44.01$, $p=0.00$) and type of health facility ($\chi^2=196.66$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to viral load monitoring.

Table 6.0.3: Differences in viral load monitoring utilisation by age among people living with HIV

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Predisposing factors					
Sex					

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Male	378	344 (91%)	428	377 (88%)	**
Female	413	371 (90%)	938	847 (90%)	$\chi^2=57.99$ (p = 0.00)
Marital Status					
Not married	658	592 (90%)	588	525 (89%)	**
Married	133	123 (92%)	778	699 (90%)	$\chi^2=294.30$ (p = 0.00)
Religion					
Roman Catholic	78	66 (85%)	147	126 (86%)	**
Apostolic Sect	123	112 (91%)	352	320 (91%)	$\chi^2=85.72$ (p = 0.00)
Pentecostal/ Protestant	243	206 (85%)	511	456 (89%)	
Other religions	347	331 (95%)	356	322 (90%)	
Education					
Primary	65	58 (89%)	427	400 (93%)	
Secondary	579	523 (90%)	847	742 (88%)	**
Tertiary	83	73 (88%)	46	39 (85%)	$\chi^2=185.92$ (p = 0.00)
Do not know/Did not attend/No answer	64	61 (95%)	46	43 (93%)	
Vaccinated for COVID-19					
Yes	602	552 (92%)	1 149	1 131 (98%)	**
No	189	163 (86%)	117	93 (79%)	$\chi^2=90.99$ (p = 0.00)

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Need factors					
Pregnancy in the past 24 months					
Yes	59	53 (90%)	137	124 (91%)	x²=0.03 (p = 0.87)
No	354	318 (90%)	801	723 (90%)	
Opportunistic infection					
Yes					
No	35	33 (94%)	212	201 (95%)	**
	756	682 (90%)	1,154	1 023 (89%)	x²=59.28 (p = 0.00)
COVID-19 infection					
Yes	72	62 (86%)	243	221 (91%)	**
No	719	653 (91%)	1,123	1 003 (89%)	x²=31.89 (p = 0.00)
Contact of a COVID-19 case					
Yes	97	83 (86%)	320	294 (92%)	**
No	694	632 (91%)	1,046	930 (89%)	x²=44.38 (p = 0.00)
Environmental factors					
Residence					

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Rural	443	397 (90%)	931	862 (93%)	**
Urban	348	318 (91%)	435	362 (83%)	$\chi^2=44.01$ (p = 0.00)
Type of health facility					
Central /Provincial health facility	78	68 (87%)	16	15 (94%)	** $\chi^2=196.66$ (p = 0.00)
District health facility	80	78 (98%)	476	440 (92%)	
Primary health care facility	633	569 (90%)	874	769 (88%)	

** = p < 0.01, * = p < 0.05

Figure 6.2 shows the differences in proportion of enabling factors as reasons for not utilising viral load monitoring among adolescents and young people (15–24) and adults (25+). Concerning the enabling factors, COVID-19 lockdown restrictions was mentioned as the main reason that contributed to non-utilisation of viral load monitoring in both adolescents and young people (15–24) and adults (25+). The proportion was 51% in both adolescents and young people and adults. COVID-19 transport stoppages were the second highest reason for non-utilisation of the viral load monitoring with 16% in adolescent and young people compared to 8% in adults. Fear of contracting COVID-19 had a relatively higher proportion among adolescents compared to adults (13%) and 10% among adults.

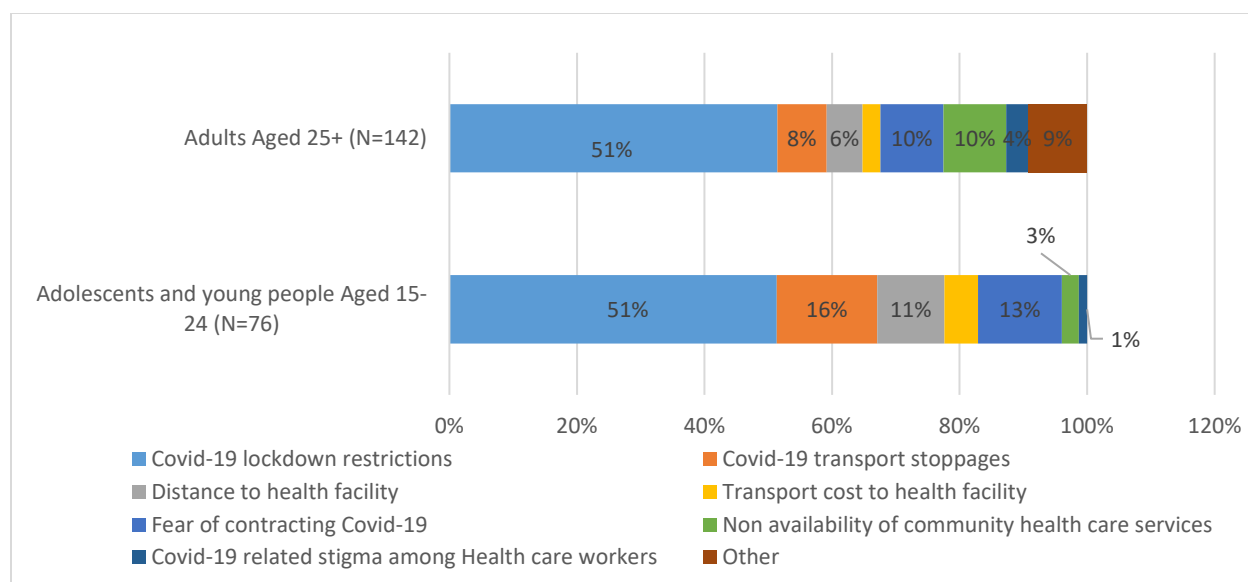


Figure 6.2: Enabling factors: Comparison of reasons for not accessing viral load monitoring among adolescents and young people (15–24) and adults (25+)

Table 6.4 represents the multivariate analysis of differences in viral load monitoring utilisation by age. Regarding predisposing factors, among adults, being male was significantly associated with lesser odds of viral load monitoring utilisation (AOR=0.65; 95% CI: 0.43–0.98) in comparison with females. This was however not significant in adolescents and young people (AOR=1.17; 95% CI: 0.70–1.97). Being vaccinated for COVID-19 was significantly associated with higher odds of viral load monitoring utilisation (AOR=2.27; 95% CI: 1.33–3.88) among adults. This was however not significant in adolescents and young people (AOR=1.71; 95% CI: 0.98–2.99).

Regarding need factors, adults who had an opportunistic infection was significantly associated with higher odds of viral load monitoring among people living with HIV (AOR=2.53; 95% CI: 1.23–5.22). However, among adolescents and young people there was no significant association (AOR=2.55; 95% CI: 0.53–12.23). Regarding environmental factors, adults residing in a rural area was significantly associated with higher odds of viral load monitoring among people living with

HIV (AOR=2.09; 95% CI: 1.38– 3.14) in comparison with their urban counterparts. However, among adolescents and young people there was no significant association (AOR=0.66; 95% CI: 0.26–1.68).

Table 6.0.4: Multivariate analysis of differences in viral load monitoring utilisation by age

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Predisposing Factors				
Sex				
Male	1.17	0.70-1.97	0.65	0.43-0.98*
Female	Ref			
Marital Status				
Not married	0.91	0.4-1.92	0.83	0.57-1.22
Married	Ref			
Religion				
Roman Catholic	0.65	0.26-1.64	0.69	0.36-1.31
Apostolic Sect	Ref			
Pentecostal/ Protestant	0.48	0.23-1.04	0.90	0.55-1.47
Other religions	2.25	0.97-5.21	1.05	0.61-1.80
Education				
Primary	0.91	0.37-2.23	1.54	0.96-2.47

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Secondary	Ref			
Tertiary	0.91	0.40-2.09	1.00	0.41-2.45
Did not attend school/Do not know/No answer	1.72	0.49-6.05	1.40	0.41-4.77
COVID-19 vaccinated				
Yes	1.71	0.98-2.99	2.27	1.33-3.88**
No	Ref			
Need factors				
Opportunistic infection				
Yes	2.55	0.53-12.23	2.53	1.23-5.22*
No	Ref			
COVID-19 infection				
Yes	0.78	0.27-2.16	0.99	0.57-1.70
No	Ref			
Contact of a COVID-19 case				
Yes	0.66	0.26-1.68	0.99	0.57-1.70
No	Ref			
Environmental factors				

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Residence				
Rural	1.04	0.56-1.92	2.09	1.38-
Urban	Ref			3.14**
Type of health facility				
Central/Provincial health facility	Ref			
District health facility	3.80	0.75-19.36	0.54	0.63-4.78
Primary health care facility	0.83	0.33-2.08	0.38	0.45-3.23
Enabling factors				
COVID-19 lockdown restrictions	1.32	0.57-3.06	0.43	0.14-1.27
COVID-19 transport stoppages	Ref			
Distance to health facility	1.61	0.49-5.27	0.70	0.20-2.44
Transport cost to health facility	-		0.35	0.84-1.49
Fear of contracting COVID-19	3.42	1.25-9.29*	1.47	0.46-4.61
Non-availability of community health care services	0.61	0.93-3.99	0.26	0.71-0.95*
COVID-19 related stigma among Health care workers	1.35	0.11-15.38	0.48	0.09-2.53
Other	3.75	1.15-12.18*	0.38	0.11-1.30

** = p < 0.01, * = p < 0.05, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

6.4 TB Preventative Therapy Utilisation by Age Among People Living with HIV

Among people living with HIV (n=2 157), the study found a lower proportion of utilisation of TB preventative therapy among adults which was 83% (1134/1366) in comparison to adolescents and young people which was 90% (709/791). Table 6.5 shows the differences in TB preventative therapy utilisation by predisposing, need and environmental factors. Concerning predisposing factors, there were significant differences on sex ($\chi^2=56.75$, $p=0.00$), marital status ($\chi^2=294.30$, $p=0.00$), religion ($\chi^2=87.97$, $p=0.00$) and education ($\chi^2=169.07$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to TB preventative therapy. Concerning need factors, there were significant differences on opportunistic infection in the past 24 months ($\chi^2=65.09$, $p=0.00$), COVID-19 infection in the past 24 months ($\chi^2=27.35$, $p=0.00$) and contact with a COVID-19 case in the past 24 months ($\chi^2=29.10$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to TB preventative therapy. Concerning environmental factors, there were significant differences on residence ($\chi^2=42.93$, $p=0.00$) and type of health facility ($\chi^2=208.76$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to TB preventative therapy.

Table 6.0.5: Differences in TB preventative therapy utilisation by age among people living with HIV

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Predisposing factors					
Sex					
Male	378	342 (90%)	428	349 (82%)	**
Female	413	367 (88%)	938	785 (82%)	x ² =56.75 (p = 0.00)
Marital Status					
Not married	658	586 (89%)	588	473 (89%)	**
Married	133	123(92%)	778	661 (80%)	x ² =294.30 (p = 0.00)
Religion					
Roman Catholic	78	71 (91%)	147	116 (78%)	**
Apostolic Sect	123	101 (82%)	352	303 (86%)	x ² =87.97 (p = 0.00)
Pentecostal/ Protestant	243	211 (86%)	511	418 (82%)	
Other religions	347	326 (94%)	356	297 (83%)	
Education					
Primary	65	59 (92%)	427	367 (86%)	
Secondary	579	518 (89%)	847	685 (81%)	
Tertiary	83	73 (88%)	46	41 (90%)	**
Do not know/Did not attend/No answer	64	59 (92%)	46	41 (90%)	x ² =169.07 (p = 0.00)

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Vaccinated for COVID-19					
Yes	602	546 (90%)	1,149	1,048 (91%)	**
No	189	163 (86%)	117	86 (74%)	x²=88.61 (p = 0.00)
Need factors					
Pregnancy					
Yes	59	53 (90%)	137	116 (85%)	x²=0.02 (p = 0.88)
No	354	314 (89%)	801	669 (84%)	
Opportunistic infection					
Yes	35	30 (86%)	212	190 (90%)	**
No	756	679 (90%)	1,154	944 (82%)	x²=65.09 (p = 0.00)
COVID-19 infection in the past 24 months					
Yes	72	65 (90%)	243	208 (85%)	**
No	719	644 (90%)	1,123	926 (82%)	x²=29.10 (p = 0.00)

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Contact of a COVID-19 case in the past 24 months					
					**
Yes	97	88 (91%)	320	268 (84%)	x ² =35.25 (p = 0.00)
No	694	621 (90%)	1,046	866 (82%)	
Environmental factors					
Residence					
Rural	443	396 (90%)	931	803 (86%)	**
Urban	348	313 (90%)	435	331 (76%)	x ² =42.93 (p = 0.00)
Type of health facility where HIV services are being accessed					
Central /Provincial health facility	78	67 (85%)	16	15 (94%)	**
District health facility	80	70 (88%)	476	420 (88%)	
Primary health care facility	633	572 (90%)	874	699 (80%)	

** = p < 0.01, * = p < 0.05

Figure 6.3 shows the differences in proportion of enabling factors as reasons for not utilising TB preventative therapy among adolescents and young people (15–24) and adults (25+). Concerning the enabling factors, COVID-19 lockdown restrictions was mentioned as the main reason that contributed to non-utilisation of TB preventative therapy in both adolescents and young people (15–24) and adults (25+). The proportion was 43% in both adolescents and young people and adults. Fear of contracting COVID-19 was the second highest reason for non-utilisation of the TB preventative therapy with 16% in adolescent and young people compared to 18% in adults. Non-availability of community health workers had a relatively higher proportion among adults (12%) compared to adolescents and young people (5%).

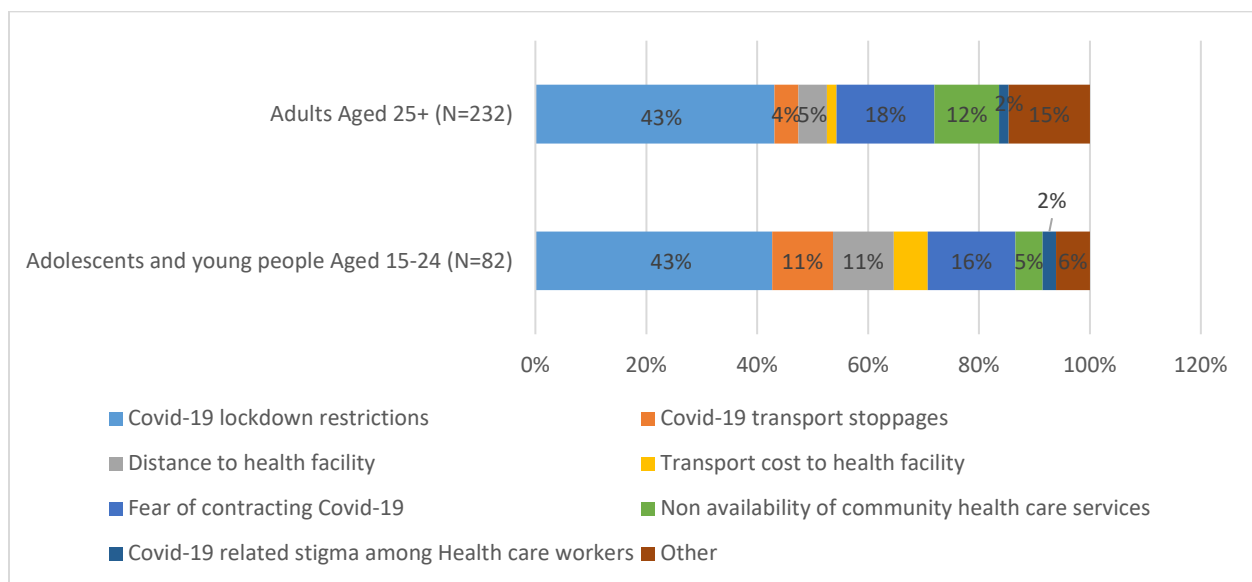


Figure 6.3: Enabling factors: Comparison of reasons for not accessing TB preventative therapy among adolescents and young people (15–24) and adults (25+)

Table 6.6 represents the multivariate analysis of differences in TB preventative therapy utilisation by age. Regarding predisposing factors, among adults, being male was significantly associated with lesser odds of TB preventative therapy utilisation (AOR=0.68; 95% CI: 0.48–0.95) in comparison with females. This was however not significant in adolescents and young people (AOR=1.34; 95% CI: 0.79 - 2.26). Among adults, being not married was significantly associated with lesser odds of TB preventative therapy utilisation (AOR=0.63; 95% CI: 0.46 - 0.86) in comparison with the married. This was however not significant in adolescents and young people (AOR=0.55; 95% CI: 0.25–1.21). Adolescents and young people in other religions were significantly associated with higher odds of TB preventative therapy utilisation (AOR=2.86; 95% CI: 1.39–5.88). This was however not significant in adults (AOR=0.96 95% CI: 0.62 - 1.48).

Being vaccinated for COVID-19 was significantly associated with higher odds of TB preventative therapy utilisation (AOR=1.72; 95% CI: 1.07–2.75) among adults. This was however not significant in adolescents and young people (AOR=1.57; 95% CI: 0.89–2.78). Regarding need factors, adults who had an opportunistic infection was significantly associated with higher odds of TB preventative therapy among people living with HIV (AOR=1.85; 95% CI: 1.08–3.15). However, among adolescents and young people there was no significant association (AOR=0.55; 95% CI: 0.18–1.62). Regarding environmental factors, adults residing in a rural area was significantly associated with higher odds of TB preventative therapy among people living with HIV (AOR=1.83; 95% CI: 1.31–2.56) in comparison with their urban counterparts. However, among adolescents and young people there was no significant association (AOR=0.83; 95% CI: 0.44–1.68). Regarding enabling factors, among adolescent and young people, fear of contracting COVID-19 was significantly associated with higher odds of TB preventative therapy utilisation

among people living with HIV (AOR=4.94 95% CI: 1.66–14.68). However, among adults there was no significant association (AOR=1.59; 95% CI: 0.73–3.45). Among both adults and adolescents and young people, non-availability of community care services was significantly associated with lesser odds of TB preventative therapy utilisation among people living with HIV (AOR=0.32 95% CI: 0.13–0.82) and (AOR=0.81 95% CI: 0.13–0.48) respectively.

Table 6.0.6: Multivariate analysis of differences in TB preventative therapy by age

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Predisposing factors				
Sex				
Male	1.34	0.79-2.26	0.68	0.48-0.95*
Female	Ref			
Marital Status				
Not married	0.55	0.25-1.21	0.63	0.46-0.86**
Married	Ref			
Religion				
Roman Catholic	1.82	0.68-4.87	0.65	0.37-1.10
Apostolic Sect	Ref			
Pentecostal/ Protestant	1.04	0.52-2.08	0.79	0.53-1.17
Other religions	2.86	1.39-5.88**	0.96	0.62-1.48

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Education				
Primary	1.34	0.50-3.63	1.12	0.78-1.59
Secondary	Ref			
Tertiary	1.08	0.46-2.57	2.41	0.89-6.51
Did not attend school/Do not know/No answer	1.41	0.50-3.93	1.35	0.50-3.61
COVID-19 vaccinated				
Yes	1.57	0.89-2.78	1.72	1.07-2.75*
No	Ref			
Need factors				
Opportunistic infection				
Yes	0.55	0.18-1.62	1.85	1.08-3.15*
No	Ref			
COVID-19 infection				
Yes	1.17	0.38-3.63	1.03	0.63-1.67
No	Ref			
Contact of a COVID-19 case in the past 24 months				

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Yes	1.21	0.44-3.34	0.70	0.44-1.06
No	Ref			
Environmental factors				
Residence				
Rural	0.83	0.44-1.68	1.83	1.31-
Urban	Ref			2.56**
Type of health facility				
Central/Provincial health facility	Ref			
District health facility	0.61	0.20-1.77	0.38	0.46-3.08
Primary health care facility	0.90	0.34-2.40	0.20	0.24-1.57
Enabling factors				
COVID-19 lockdown restrictions	1.98	0.83-4.71	0.92	0.44-1.94
COVID-19 transport stoppages	Ref			
Distance to health facility	0.95	0.34-2.65	1.03	0.44-2.44
Transport cost to health facility	0.87	0.27-2.78	0.93	0.29-2.97
Fear of contracting COVID-19	4.94	1.66-14.68**	1.59	0.73-3.45
Non-availability of community health care services	0.81	0.13-0.48*	0.32	0.13-0.82*

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
COVID-19 related stigma among -			1.02	0.36-3.34
Health care workers	11.76	3.2-43.11*	0.65	0.28-1.52
Other				

** = $p < 0.01$, * = $p < 0.05$, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

6.5 TB Screening Utilisation by Age Among People Living with HIV

Among people living with HIV (n=2 157), the study found a lower proportion of utilisation of TB screening among adults which was 70% (959/1366) in comparison to adolescents and young people which was 83% (653/791). Table 6.7 shows the differences in TB screening utilisation by predisposing, need and environmental factors. Concerning predisposing factors, there were significant differences on sex ($\chi^2=47.15$, $p=0.00$), marital status ($\chi^2=276.42$, $p=0.00$), religion ($\chi^2=98.13$, $p=0.00$) and education ($\chi^2=159.04$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to TB screening. Concerning need factors, there was significant differences on opportunistic infection in the past 24 months ($\chi^2=75.16$, $p=0.00$), COVID-19 infection in the past 24 months ($\chi^2=39.67$, $p=0.00$) and contact with a COVID-19 case in the past 24 months ($\chi^2=47.21$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to TB screening. Concerning environmental factors, there were significant differences on residence ($\chi^2=27.99$, $p=0.00$), type of health facility

($\chi^2=143.45$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to TB screening.

Table 6.0.7: Differences in TB screening utilisation by age among people living with HIV

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Predisposing factors					
Sex					
Male	378	317 (84%)	428	303 (71%)	**
Female	413	336 (81%)	938	656 (70%)	x ² =47.15 (p = 0.00)
Marital Status					
Not married	658	539 (82%)	588	392 (89%)	**
Married	133	114(86%)	778	567 (73%)	x ² =276.42 (p = 0.00)
Religion					
Roman Catholic	78	60 (77%)	147	113 (77%)	**
Apostolic Sect	123	99 (80%)	352	241 (68%)	x ² =98.13 (p = 0.00)
Pentecostal/ Protestant	243	175 (72%)	511	364 (71%)	
Other religions	347	319 (92%)	356	241 (67%)	
Education					

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Primary	65	47 (72%)		302 (70%)	
Secondary	579	480 (83%)	427	585 (69%)	**
Tertiary	83	65 (78%)	847	37 (80%)	x²=159.04 (p = 0.00)
Do not know/Did not attend/No answer	64	61 (95%)	46	35 (76%)	
			46		
Vaccinated for COVID-19					
Yes	602	516 (85%)	1,149	889 (77%)	**
No	189	137 (72%)	117	70 (60%)	x²=64.96 (p = 0.00)
Need factors					
Pregnancy					
Yes	59	51 (86%)	137	100 (72%)	x²=0.00 (p = 0.99)
No	354	285 (81%)	801	556 (69%)	
Opportunistic infection					
Yes	35	29 (83%)	212	186 (87%)	**
No	756	624 (82%)	1,154	773 (67%)	x²=75.16 (p = 0.00)
COVID-19 infection					
Yes	72	56 (77%)	243	193 (79%)	**
No	719	597 (83%)	1,123	766 (68%)	x²=39.67 (p=0.00)

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Contact with a COVID-19 case					
					**
Yes	97	78 (80%)	320	249 (77%)	x²=47.21 (p=0.00)
No	694	575 (83%)	1,046	710 (68%)	
Environmental factors					
Residence					
					**
Rural	443	368 (83%)	931	664 (71%)	x²=27.99 (p=0.00)
Urban	348	285 (82%)	435	295 (68%)	
Type of health facility where HIV services are being accessed					
					**
Central /Provincial health facility	78	39 (50%)	16	14 (87%)	x²=143.45 (p=0.00)
	80	76 (95%)	476	357 (75%)	
District health facility	633	538 (85%)	874	588 (67%)	
Primary health care facility					
**=p < 0.001, ** = p < 0.01					

**=p < 0.001, ** = p < 0.01

Figure 6.4 shows the differences in proportion of enabling factors as reasons for not utilising TB screening among adolescents and young people (15–24) and adults (25+). Concerning the enabling factors, COVID-19 lockdown restrictions was mentioned as the main reason that contributed to non-utilisation of TB screening in both adolescents and young people (15–24) and adults (25+).

The proportion for adolescents and young people (38%) was slightly higher than adults (36%). Fear of contracting COVID-19 was the second highest reason for non-utilisation of TB screening with 25% of adolescents and young people compared to 17% in adults. Distance to the health facility had a relatively higher proportion among adults (12%) compared to adolescents and young people (10%).

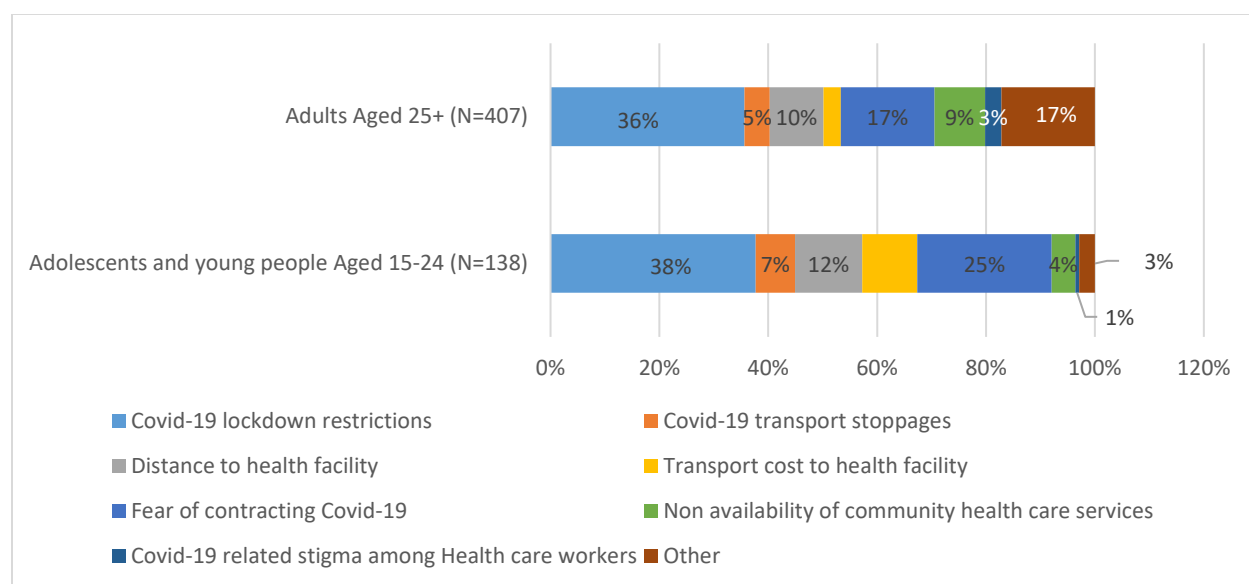


Figure 6.4: Enabling factors: Comparison of reasons for not accessing TB screening among adolescents and young people (15-24) and adults (25+)

Table 6.8 represents the multivariate analysis of differences in TB screening utilisation by age. Regarding predisposing factors, among adults, being not married was significantly associated with lesser odds of TB screening utilisation (AOR=0.70; 95% CI: 0.54–0.90) in comparison with the married. This was however not significant in adolescents and young people (AOR=0.98 95% CI: 0.53–1.82). Adolescents and young people in other religions were significantly associated with higher odds of TB screening utilisation (AOR=2.31; 95% CI: 1.20–4.49) in comparison with the married. This was however not significant in adults (AOR=1.05 95% CI: 0.75–1.48).

Being vaccinated for COVID-19 was significantly associated with higher odds of TB screening utilisation in both adolescent and young people (AOR=1.97; 95% CI: 1.22–3.16) and also among adults (AOR=1.74; 95% CI: 1.14–2.65). Regarding need factors, adults who had an opportunistic infection was significantly associated with higher odds of TB screening among people living with HIV (AOR=3.36; 95% CI: 2.06–5.45). However, among adolescents and young people there was no significant association (AOR=1.02; 95% CI: 0.36–2.91). Regarding environmental factors, accessing health services at district and primary health facilities was significantly associated with higher odds of TB screening among adolescents and young people (AOR=8.61; 95% CI: 2.59–28.61) and (AOR=6.95; 95% CI: 3.31–14.61) respectively. This was not significant in adults.

Regarding enabling factors among adolescent and young people, COVID-19 lockdown restrictions (AOR=2.53 95% CI: 1.13–5.67) was significantly associated with higher odds of TB screening utilisation among people living with HIV. However, among adults there was no significant association (AOR=1.07; 95% CI: 0.59–1.92). Among adolescent and young people, distance to health facility (AOR=2.53; 95% CI: 1.13–5.67) was significantly associated with lesser odds of TB screening utilisation among people living with HIV. However, among adults there was no significant association (AOR=1.38; 95% CI: 0.70–2.70). Fear of contracting COVID-19 (AOR=2.32 95% CI: 1.26–4.28) was significantly associated with higher odds of TB screening utilisation among adults living with HIV. However, among adolescents and young people there was no significant association (AOR=2.06; 95% CI: 0.84–5.02).

Table 6.0.8: Multivariate analysis of differences in TB screening by age of people living with HIV

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Predisposing factors				
Sex				
Male	1.29	0.83-2.01	0.82	0.62-1.09
Female	Ref			
Marital Status				
Not married	0.98	0.53-1.82	0.70	0.54-0.90**
Married	Ref			
Religion				
Roman Catholic	0.78	0.34-1.74	1.59	0.98-2.55
Apostolic Sect	Ref			
Pentecostal/ Protestant	0.69	0.37-1.27	1.20	0.87-1.64
Other religions	2.31	1.20-4.49**	1.05	0.75-1.48
Education				
Primary	0.77	0.37-1.60	1.01	0.76-1.33
Secondary	Ref			
Tertiary	1.41	0.67-2.98	1.99	0.91-4.36
Did not attend school/Do not know/No answer	2.20	0.63-7.63	1.48	0.71-3.07

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
COVID-19 vaccinated				
Yes	1.97	1.22-3.16**	1.74	1.14-2.65**
No	Ref			
Need factors				
Opportunistic infection				
Yes	1.02	0.36-2.91	3.36	2.06-5.45**
No	Ref			
COVID-19 infection				
Yes	0.89	0.35-2.28	1.20	0.79-1.81
No	Ref			
Contact with a COVID-19 case				
Yes	0.68	0.30-1.55	1.14	0.80-1.62
No	Ref			
Environmental factors				
Residence				

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Rural	0.72	0.41-1.27	1.11	0.82-1.47
Urban	Ref			
Type of health facility				
Central/Provincial health facility	Ref			
District health facility	8.61	2.59-28.61**	0.25	0.53-1.17
Primary health care facility	6.95	3.31-14.61**	0.21	0.47-1.02
Enabling factors				
COVID-19 lockdown restrictions	2.53	1.13-5.67*	1.07	0.59-1.92
COVID-19 transport stoppages	Ref			
Distance to health facility	0.28	0.10-0.77*	1.38	0.70-2.70
Transport cost to health facility	1.17	0.41-3.34	0.76	0.31-1.87
Fear of contracting COVID-19	2.06	0.84-5.02	2.32	1.26-4.28**
Non-availability of community health care services	0.48	0.11-1.94	1.19	0.51-2.77
COVID-19 related stigma among Health care workers	2.67	0.28-24.56	1.11	0.44-2.84
Other	0.96	0.40-2.28	2.29	1.09-4.78

** = p < 0.01, * = p < 0.05, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

CHAPTER SEVEN: COVID-19 VACCINATION AMONG PEOPLE LIVING WITH HIV

7.1 Introduction

In the fight against the HIV epidemic there is need to ensure that all people living with HIV are able to access treatment services so there is reduction of morbidity and mortality. The fight against the HIV epidemic may be more difficult if there is no full protection against emerging epidemics such as COVID-19. In this chapter findings are presented on the predisposition of people living with HIV on antiretroviral therapy to utilize the COVID-19 vaccine and factors that influence their decision in Zimbabwe. Secondly the study highlights if there are differences in COVID-19 vaccine coverages and predictors between adolescents and young people (15-24) and adults (25+) living with HIV.

7.2 Utilisation of the COVID-19 Vaccine Among People Living with HIV

Eighty-six percent of the study participants living with HIV had been vaccinated for COVID-19. Table 7.1 shows the proportion of utilisation of the COVID-19 vaccine among people living with HIV by predisposing, need and environmental factors.

7.2.1 Predisposing factors

Age $\chi^2=104.7$ ($p=0.00$) and marital status $\chi^2=21.64$ ($p=0.00$) were the predisposing factors that were significantly associated with getting vaccinated for COVID-19 among people living with HIV using bivariate analysis. The study found the adolescents and young people age group of 15–

24 had the least proportion (76%) of people living with HIV vaccinated for COVID-19. In terms of sex, males contributed the least proportion vaccinated with 84% in comparison with 86% among females. People living with HIV who were not married had the least proportion of vaccination of 82% compared to 90% among the married. The Roman Catholic and Pentecostal/Protestants had the least proportion of vaccination with 83% and 84% respectively. Those that had attained secondary and tertiary education had the least proportion of 85% compared with 88% who had attained primary level education.

7.2.2 Need factors

Opportunistic infection in the past 24 months $\chi^2=10.91$ ($p=0.001$), COVID-19 infection in the past 24 months $\chi^2=14.36$ ($p=0.00$) and contact with a COVID-19 case in the past 24 months $\chi^2=39.38$ ($p=0.00$) were the need factors that were significantly associated with getting vaccinated for COVID-19 among people living with HIV using bivariate analysis. On being pregnant in the last 24 months, there was a marginal proportional difference in vaccine utilisation of 86% and 87% on females that were pregnant and those that were not respectively. Of the study participants, 29% (56/196) of the females living with HIV who were pregnant during the COVID-19 pandemic periods were not vaccinated for COVID-19. People living with HIV who had not had an opportunistic infection in the past 24 months had a lower proportion of 85% compared to 93% of those that had an opportunistic infection. A similar picture was seen on people living with HIV who had not had a COVID-19 infection in the past 24 months who had a lower utilisation proportion of 85% compared to 93% of those that had a COVID-19 infection. Moreover, people living with HIV who had not been in contact with a COVID-19 case in the past 24 months had a

lower utilisation proportion of 84% compared to 95% of those that had not been in contact with a COVID-19 case.

Table 7.0.1: Proportion of people living with HIV vaccinated for COVID-19 by predisposing, need and environmental factors (N=2 157)

Categories	Total	Vaccinated	Proportion	Chi² (P-value)
Predisposing factors				
Age		**		
15-24	791	602	76%	x²=104.7- (p = 0.00)
25-34	300	260	87%	
35-44	414	379	92%	
45+	652	610	94%	
Sex				
Male	806	679	84%	x²=2.61 (p = 0.11)
Female	1351	1,172	86%	
Marital Status				
Not married	1,246	1,032	82%	x²=21.64 (p = 0.00)
Married	911	819	90%	
Religion				
Roman Catholic	225	188	83%	x²=5.17 (p = 0.16)
Apostolic Sect	475	421	89%	
Pentecostal/ Protestant	754	637	84%	
Other religions	703	605	86%	

Categories	Total	Vaccinated	Proportion	Chi² (P-value)
Education				
Primary	492	431	88%	x²=2.79 (p = 0.42)
Secondary	1,426	1,213	85%	
Tertiary	129	144	88%	
Do not know/Did not attend school/No answer	110	93	85%	
Need factors				
Pregnancy				
Yes	196	168	86%	x²=0.21 (p = 0.64)
No	1,155	1,004	87%	
Opportunistic Infection				
		**		x²=10.91 (p = 0.001)
Yes	247	229	93%	
No	1910	1,622	85%	
COVID-19 Infection				
		**		x²=14.36 (p = 0.00)
Yes	315	292	93%	
No	1842	1,559	85%	
Contact of a COVID-19 Case				
		**		x²=39.38 (p = 0.00)
Yes	417	398	95%	
No	1740	1,453	84%	

Categories	Total	Vaccinated	Proportion	Chi ² (P-value)
Environmental Factors				
Residence		**		
Rural	1374	1,208	88%	x ² =13.78 (p = 0.00)
Urban	783	643	82%	
Type of health facility		**		
Central/Provincial health facility	94	70	74%	x ² =20.18 (p = 0.00)
District health facility	556	502	90%	
Primary health care facility	1507	1,279	84%	

** = p < 0.01; * = p < 0.05

7.2.3 Environmental factors

Residence $\chi^2=13.78$ (p=0.00) and type of health facility $\chi^2=20.18$ (p=0.00) were the environmental factors that were significantly associated with getting vaccinated for COVID-19 among people living with HIV using bivariate analysis. The proportion of utilisation of the COVID-19 vaccine among people living with HIV was higher in rural areas (88%) as compared to 82% in rural areas. Moreover, people living with HIV accessing their health services at central/provincial hospitals had a lower utilisation proportion of the vaccine (74%) in comparison to those accessing at district health facilities (90%) and those primary health care facilities (84%).

7.2.4 Enabling factors

Fear of side effects contributed to the majority (48%) reason for not getting vaccinated among the study participants as presented in Figure 7.1. This was followed by religious reasons (22%) and then being unsure if people living with HIV should get vaccinated (15%). Distance to vaccination sites and transport costs to vaccination sites had the least proportion of less than 2% as 13% were due to other reasons.

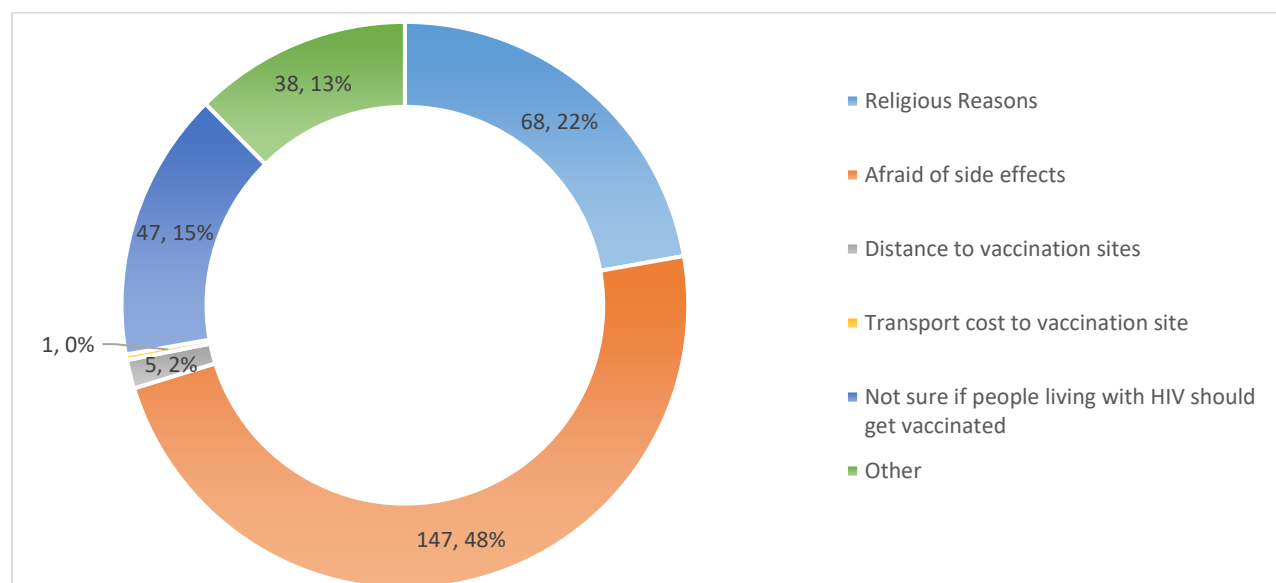


Figure 7.1: Enabling factors: Reasons for not getting vaccinated among people living with HIV (N=305)

The reasons noted above in the quantitative findings were also explained in the qualitative in-depth interviews. The fear of side effects as the major reason was validated by the community volunteers as 90% of the community volunteers concurred that there was a fear of the side effects.

We struggled with issues of false information that vaccines were not safe for people living with HIV, hence there was hesitance to get vaccinated (Community volunteer in-depth interviews).

As such, vaccination among people living with HIV then started to increase following vaccination campaigns in which this fear was properly addressed. Religious reasons were also noted to have influenced some hesitancy in vaccination among people living with HIV.

Information that about the vaccine being associated with Satanism made it difficult for some to get the COVID-19 vaccine (Community volunteer in-depth interviews).

7.3 Multivariate Analysis of Utilisation of the COVID-19 Vaccine Among People

Living with HIV

Regarding predisposing factors, the age group of 15–24 was significantly associated with less likelihood of getting the COVID-19 vaccination (AOR=0.54; 95% CI: 0.35–0.83) in comparison with their 25–34 counterparts as presented in Table 7.2. Older ages, age 35–44 (AOR=1.80; 95% CI: 1.10–2.93) and age 45+ (AOR=2.42; 95% CI: 1.52–3.87) were associated with higher odds of COVID-19 vaccination among people living with HIV in comparison with the 20–24 age group. People living with HIV in which primary level education was their highest level of education (AOR=0.69; 95% CI: 0.49–0.98) was significantly associated with less likelihood of getting the COVID-19 vaccination in comparison with their secondary level counterparts.

Regarding need factors, having previous contact with a COVID-19 case was significantly associated with higher odds of COVID-19 vaccination (AOR=3.43; 95% CI: 1.92–6.12) in comparison with not getting vaccinated. Regarding environmental factors, being in a rural area was significantly associated with higher odds of COVID-19 vaccination among people living with HIV (AOR=1.40; 95% CI: 1.06–1.85) in comparison with their urban counterparts.

Table 7.0.2: Multivariate logistic regression analysis of the factors of COVID-19 vaccination among people living with HIV (N=2 157)

Categories	P-value	AOR	95% CI
Predisposing Factors			
Age			
15-24	0.01*	0.54	0.35-0.83
25-34	Ref		
35-44	0.02*	1.80	1.10-2.93
45+	0.00**	2.42	1.52-3.87
Sex			
Male	0.65	0.94	0.70-1.20
Female	Ref		
Marital Status			
Not married	0.59	0.92	0.68-1.24
Married	Ref		
Religion			
Roman Catholic	0.24	0.75	0.47-1.21
Apostolic Sect	Ref		
Pentecostal/ Protestant	0.17	0.78	0.54-1.13
Other religions	0.63	1.09	0.75-1.60
Education			
Primary	0.04*	0.69	0.49-0.98

Categories	P-value	AOR	95% CI
Secondary	ref		
Tertiary	0.05	1.80	0.99-3.26
Do not know/Did not attend/No answer	0.61	1.15	0.65-2.03
Need Factors			
Opportunistic Infection			
Yes	0.58	1.16	0.67-2.04
No	Ref		
COVID-19 Infection			
Yes	0.65	0.87	0.51-1.52
No	Ref		
Contact with a COVID-19 Case			
Yes	0.00**	3.43	1.92-6.12
No	Ref		
Environmental Factors			
Residence			
Rural	0.02*	1.40	1.06-1.85
Urban	Ref		
Type of health facility			
Central /Provincial health facility	Ref		
District health facility	0.50	1.23	0.67-2.25

Categories	P-value	AOR	95% CI
Primary health care facility	0.92	1.03	0.59-1.77

** = $p < 0.01$, * = $p < 0.05$, Ref=Reference category, CI=Confidence Interval

7.4 Comparison of Utilisation of COVID-19 Vaccination Among People Living with HIV by Age

Among people living with HIV who were vaccinated (n=1 851), the study found a higher proportion of utilisation of COVID-19 vaccination among adults 25+ which was 91% (1249/1366) in comparison to adolescents and young people which was 76% (602/791). Table 6.3 shows the differences in COVID-19 vaccine utilisation by predisposing, need and environmental factors.

In-depth interviews also showed that the severity of COVID-19 in older age bands also led to COVID-19 vaccine messaging being targeted more towards the older age bands:

COVID-19 had more severe consequences in older age bands hence messaging may have follow suit for the protection of those who were mostly vulnerable (Community volunteer in-depth interviews).

Concerning predisposing factors, there was significant differences on sex ($\chi^2=42.29$, $p=0.00$), marital status ($\chi^2=247.12$, $p=0.00$), religion ($\chi^2=73.77$, $p=0.00$) and education ($\chi^2=197.46$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to COVID-19 vaccination. Both adolescents and young people (15–24) and adults (25+) had males with a lower proportion of non-utilisation compared to females. Adolescents and young people had 75% and 77% among males and females respectively while adults had 92% and 91% among males and females respectively. Both adolescents and young people (75% compared to 82%) and

adults (92% compared to 91%) had the not married with lower proportion utilisation, with a slight difference in adults. Concerning religion, the Pentecostal/Protestant group had lower utilisation among adolescents and young people (70%) compared to adults (92%). Among adults, the lowest utilisation was among the Roman Catholics (86%). Adolescents and young people who had attained primary education only, also had a lower proportion of 52% compared to 93% among adults with primary education.

Concerning need factors, there were significant differences on opportunistic infection in the past 24 months ($\chi^2=46.96$, $p=0.00$), COVID-19 infection in the past 24 months ($\chi^2=21.38$, $p=0.00$) and contact with a COVID-19 case in the past 24 months ($\chi^2=25.04$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to COVID-19 vaccination. Among participants who had been pregnant during COVID-19 restriction periods, 78% vaccinated for COVID-19 among adolescents and young people in comparison to 89% among adults. Among adolescents and young people who had an opportunistic infection, utilisation of the COVID-19 vaccines was lower (85%) in adolescents and young people than that of adults (95%). For adolescents and young people who had a COVID-19 infection, their utilisation of the COVID-19 vaccine was lower (85%) than that of adults (95%). Similarly, on being in contact with a COVID-19 case, adolescents and young people had lower utilisation of the COVID-19 vaccination (91%) compared to adults (97%).

Concerning environmental factors, there were significant differences on residence ($\chi^2=48.56$, $p=0.00$) and type of health facility ($\chi^2=193.61$, $p=0.00$) between adolescents and young people (15–24) and adults (25+) living with HIV as it relates to COVID-19 vaccination. Adolescents and young people residing in rural areas had lower vaccine utilisation (74%) compared to adults which

was unlike among adult's urban residents (95%). In the two different age groups, getting vaccinated for COVID-19 at a central/provincial health facility had lower utilisation proportion with 76% in adolescents and young people and 69% in adults. There was also a lower utilisation proportion among adolescents and young people (78%) accessing health services at district health facilities compared to 92% for adults.

Table 7.0.3: Differences in vaccine utilisation by age among people living with HIV

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Predisposing factors					
Sex					
Male	378	284 (75%)	428	395 (92%)	**
Female	413	318 (77%)	938	854 (91%)	x ² =42.29 (p = 0.00)
Marital Status					
Not married	658	493 (75%)	588	539 (92%)	**
Married	133	109 (82%)	778	710 (91%)	x ² =247.12 (p = 0.00)
Religion					
Roman Catholic	78	61 (78%)	147	127 (86%)	**
Apostolic Sect	123	97 (79%)	352	324 (92%)	x ² =73.77 (p = 0.00)
Pentecostal/ Protestant	243	169 (70%)	511	468 (92%)	

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Other religions	347	275 (79%)	356	330 (93%)	
Education					
Primary	65	34 (52%)	427	397 (93%)	
Secondary	579	445 (77%)	847	768 (91%)	**
Tertiary	83	70 (84%)	46	44 (96%)	x ² =197.46 (p = 0.00)
Do not know/Did not attend/No answer	64	53 (83%)	46	40 (87%)	
Pregnancy					
Yes	59	46 (78%)	137	122 (89%)	x ² =0.01 (p = 0.94)
No	354	272 (77%)	801	732 (91%)	
Opportunistic infection					
Yes	35	29 (83%)	212	200 (94%)	**
No	756	573 (76%)	1,154	1,049 (91%)	x ² =46.96 (p = 0.00)
COVID-19 infection in the past 24 months					
Yes	72	61 (85%)	243	231 (95%)	**
No	719	541 (75%)	1,123	1,018 (91%)	x ² =21.38 (p = 0.00)

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366		Chi2 (P-value)
	Total	Utilisation	Total	Utilisation	
Contact of a COVID-19 case in the past 24 months					
Yes	97	88 (91%)	320	310 (97%)	**
No	694	514 (74%)	1,046	939 (90%)	x ² =25.04 (p = 0.00)
Residence					
Rural	443	326 (74%)	931	882 (95%)	**
Urban	348	276 (79%)	435	367 (84%)	x ² =48.56 (p = 0.00)
Type of health facility where HIV services are being accessed					
Central /Provincial health facility	78	59 (76%)	16	11 (69%)	**
District health facility	80	62 (78%)	476	440 (92%)	x ² =193.61 (p = 0.00)
Primary health care facility	633	481 (76%)	874	798 (91%)	

** = p < 0.01, * = p < 0.05

Figure 7.2 shows the differences in the proportion of enabling factors as reasons for not getting vaccinated among adolescents and young people (15–24) and adults (25+). Concerning the

enabling factors, being afraid of side effects was mentioned as the main reason that contributed to non-utilisation of the COVID-19 vaccine in both adolescents and young people (15–24) and adults (25+). However, the proportion was higher in adults (68%) as compared to 35% in adolescents and young people. Religious reasons for non-utilisation of the COVID-19 vaccine was 26% in adolescents and young people compared to 16% in adults. Being not sure if people living with HIV can be vaccinated for COVID-19 had a higher proportion among adolescents and young people (18%) and 10% among adults.

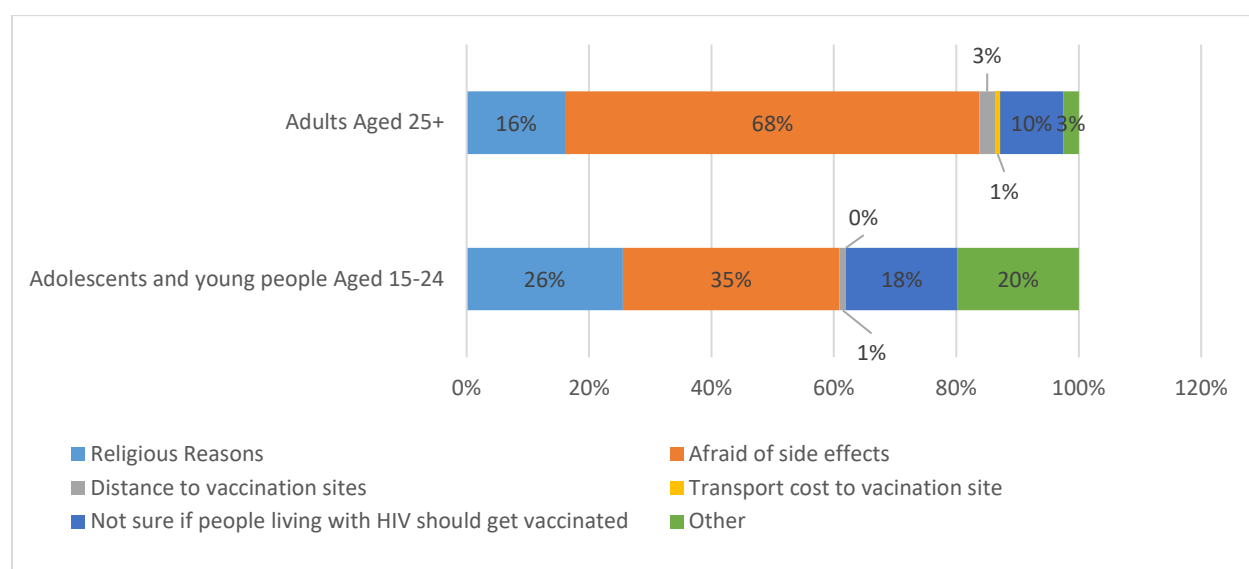


Figure 7.2: Enabling factors: Comparison of reasons for not getting vaccinated among adolescents and young people (15–24) and adults (25+) (N=306)

7.5 Multivariate Analysis of Differences in Vaccine Utilisation by Age

Table 7.4 represents multivariate analysis of differences in vaccine utilisation by age. Regarding predisposing factors, among adolescents and young people, primary level education was significantly associated with lesser odds of COVID-19 vaccination (AOR=0.34; 95% CI: 0.20–

0.60) in comparison with secondary level education. This was however not significant in adults (AOR=0.93; 95% CI: 0.58–1.49). Regarding need factors, being in previous contact with a COVID-19 case was significantly associated with higher odds of COVID-19 vaccination in both age groups (AOR=4.18; 95% CI: 1.59–10.98) among adolescents and young people (15–24) and (AOR=2.94; 95% CI: 1.37–6.31) among adults (25+).

Regarding environmental factors, adults residing in a rural area was significantly associated with higher odds of COVID-19 vaccination among people living with HIV (AOR=3.32; 95% CI: 2.16–5.10) in comparison with their urban counterparts. However, among adolescents and young people there was no significant association (AOR=0.71; 95% CI: 0.46–1.09). Accessing health services at district health facilities was significantly associated with higher odds of COVID-19 vaccination among adults living with HIV (AOR=4.74; 95% CI: 1.43–15.66) compared to those accessing vaccination in central and provincial hospitals. However, among adolescents and young people there was no significant association (AOR=0.82; 95% CI: 0.36–1.81). Accessing health services at primary health facilities was significantly associated with higher odds of COVID-19 vaccination among people living with HIV (AOR=4.55; 95% CI: 1.42–14.52) than those accessing them at central and provincial hospitals. However, among adolescents and young people there was no significant association (AOR=1.09; 95% CI: 0.55–2.17).

Table 7.0.4: Multivariate analysis of differences in vaccine utilisation by age

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Predisposing factors				
Marital Status				
Not married	0.79	0.48-1.31	1.16	0.77-1.74
Married	Ref			
Religion				
Roman Catholic	1.00	0.49-2.04	0.81	0.42-1.57
Apostolic Sect	Ref			
Pentecostal/ Protestant	0.64	0.37-1.08	1.26	0.74-2.13
Other religions	1.03	0.60-1.74	1.38	0.78-2.48
Education				
Primary	0.34	0.20-0.60**	0.93	0.58-1.49
Secondary	Ref			
Tertiary	1.62	0.83-3.16	2.84	0.65-12.27
Did not attend school/Do not know/No answer	1.54	0.77-3.09	0.38	0.15-0.99*
Need factors				
Opportunistic infection in the past 24 months				

Categories	Adolescents and young people living with HIV (15-24) N=791		Adults (25+) living with HIV N=1 366	
	AOR	95% CI	AOR	95% CI
Yes	1.47	0.54-3.99	0.96	0.47-1.95
No	Ref			
COVID-19 infection in the past 24 months				
Yes	0.58	0.23-1.47	1.11	0.53-2.31
No	Ref			
Contact of a COVID-19 case in the past 24 months				
Yes	4.18	1.59-10.98**	2.94	1.37-6.31**
No	Ref			
Environmental factors				
Residence				
Rural	0.71	0.46-1.09	3.32	2.16-5.10**
Urban	Ref			
Type of health facility				
Central/Provincial health facility	Ref			
District health facility	0.82	0.36-1.81	4.74	1.43-15.66*
Primary health care facility	1.09	0.55-2.17	4.55	1.42-14.52*

** = $p < 0.01$, * = $p < 0.05$, Ref=Reference category, CI=Confidence Interval, AOR=Adjusted Odds Ratio

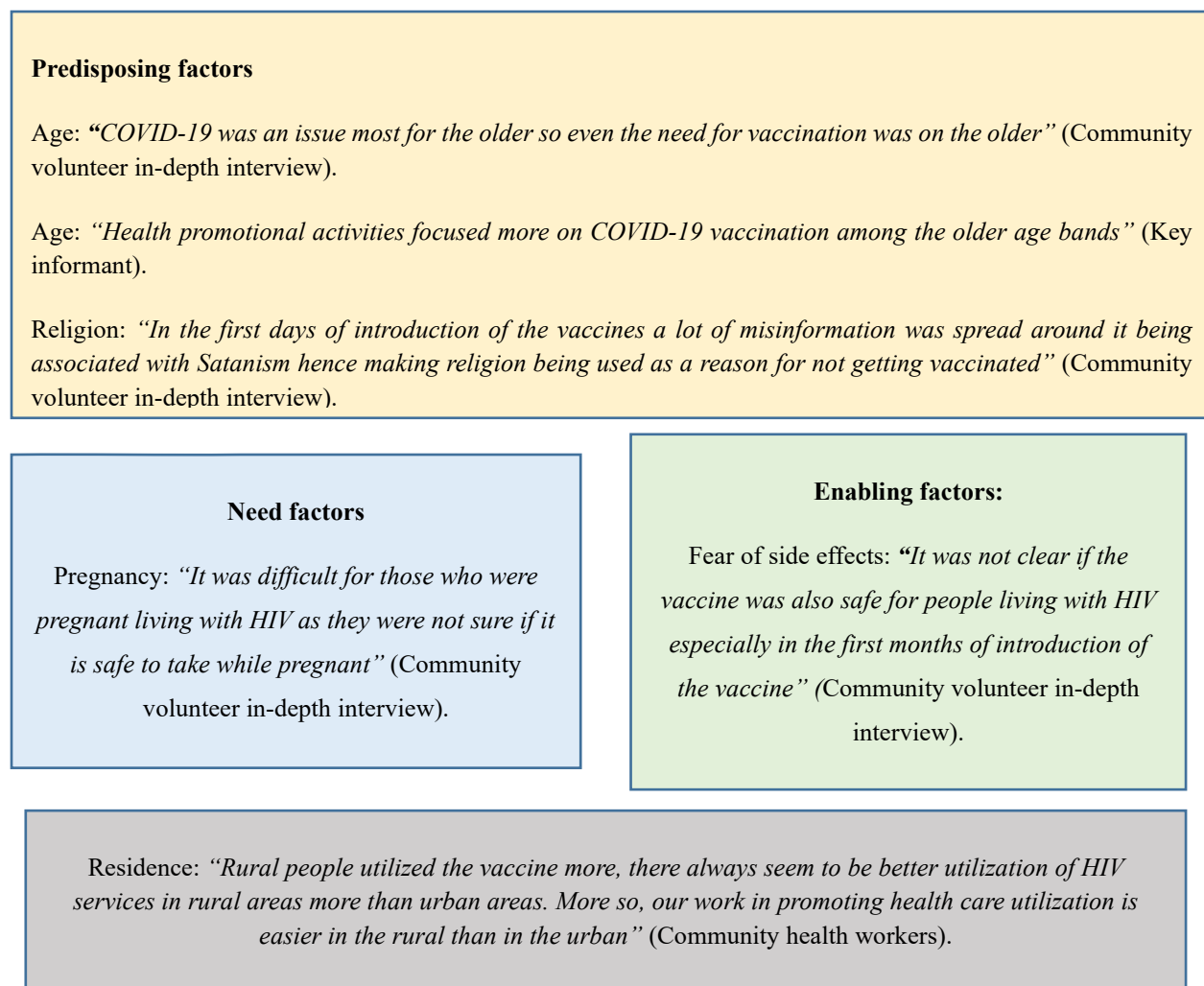


Figure 7.3: Selected responses from in-depth interviews

CHAPTER EIGHT: DISCUSSION

8.1 Introduction

The study was conducted to explore the predictors of continued utilization of HIV treatment services since the COVID-19 outbreak among people who are living with HIV on ART in Zimbabwe. A mixed method concurrent design was used to collect data for the study. In regard to exploring the predictors for utilization of HIV services in the advent of COVID-19, multivariate analyses showed that categories of age, marital status, religion, COVID-19 vaccination, opportunistic infections, residence, type of facility and fear of contracting COVID-19 had a significant likelihood for HIV services utilization in the advent of COVID-19. More differences were noted in regards utilisation of HIV services during the COVID-19 pandemic between adolescents and young people living with HIV in comparison to adults living with HIV. The study was also conducted to investigate the predisposition of people on ART to utilize the COVID-19 vaccine and factors that influence their decision. Factors such as age, education and residence were significant in predicting COVID-19 vaccination among people living with HIV. This Chapter focuses on the discussions of the main findings from this study.

8.2 Utilisation of HIV Services During the COVID-19 Period

8.2.1 Effects of COVID-19 on HIV services utilisation

Concerning the COVID-19 outbreak effects on the utilisation of HIV treatment services, the study found that 7% (147/2157) of people living with HIV who were part of the study had interruptions in accessing their ART drug refills. In terms of accessing routine viral load monitoring, 10%

(218/2157) of the people living with HIV reported an interruption. COVID-19 lockdown restrictions were noted as the main reason for not accessing services as expected during the time of COVID-19 curtailing measures. The influence of COVID-19 being a barrier to attending clinic ART drug refills in this study is consistent with studies conducted in different countries and regions (Campbell et al., 2022; Chilot et al., 2022; Dear et al., 2021; Fernandez et al., 2021; Tamargo et al., 2021). However, in a study in South Africa, the impact of COVID-19 influencing ART drug refills was not found (Dorward et al., 2021). The study ascertained through qualitative interviews with Community HIV volunteers that although only 7% had actual interruptions in access their HIV services, the challenges in general had been heightened by COVID-19. The already existing barriers to accessing HIV services among people living with HIV such as distance, transport cost among others increased intensity. More so, for those clients that had access their ART drugs in Zimbabwe but are working in neighbouring countries such as South Africa and Botswana, it thus became more difficult for them to be send their drugs as the borders were closed and movement was restricted. There is thus, a reason to believe that due COVID-19 there was fuelling of the intensity of the already existing barriers to access of ART among people living with HIV.

8.2.2 Low utilisation of TB services by people living with HIV

This study aimed to answer the research question of which the first part wanted to check if COVID-19 intensified the barriers to accessing HIV services. The study found that the utilisation of TB services among people living with HIV was relatively low compared to ART drug refills and viral load monitoring. At least 14% of the people living with HIV eligible for TB preventative therapy also reported an interruption in accessing the service. Tuberculosis (TB) screening had the highest non-utilisation proportion as 25% (314/2157) had interruptions accessing their routine TB

screening. This was also consistent with several studies that noted a decline in the utilisation of TB services (Abdool Karim & Baxter, 2022; Bell et al., 2020). The finding also confirms what has been documented in the literature that COVID-19 lockdown measures made it harder to access TB identification and treatment services among the general population. In addition, a global decrease in the number of new TB cases identified and treated was recorded during the COVID-19 pandemic (MacLean et al., 2022; Ruhwald et al., 2022).

This study therefore confirmed this for the people living with HIV population who require the TB services to guard against HIV and TB comorbidity. The reasons for low utilisation of TB services among people living with HIV was explained in qualitative in-depth interviews in two ways. Firstly, among the key informants this was noted as a function of being in an emergency mode, whereby the people living with HIV had to prioritise the services that they deemed most important. The ART drug refills became the most important and they would not prioritise getting TB screening or their TB preventative therapy course. Secondly, among the community volunteer in-depth interviews, TB symptoms were similar to COVID-19 symptoms and this was explained as a barrier. Hence, there was some level of stigma towards accepting services such as TB screening.

8.3 Predisposing Factors

8.3.1 Age

The study found that the utilization of ART drug refill services was significantly associated with ages 15-24, 35-44, 45+. On utilization of viral load monitoring services ages 15-24, 35-44, 45+, being adult male 25+ on comparison between adolescents and young people and adults were significantly associated. On utilization of TB preventive therapy ages 15-24, 35-44, 45+, being adult 25+ male on comparison between adolescents and young people and adults, was significantly

associated. On TB screening services ages 15-24 and 35-44, significantly associated. In other studies age has also been documented as an important factor in health care utilization as mainly older adults use more health care services than younger age groups (Institute of Medicine (US) Committee on the Future Health Care Workforce for Older Americans, 2008).

The study also found that vaccine coverage was 86% among the people living with HIV who were enrolled in the study. A higher proportion of people who were not yet vaccinated for COVID-19 was among adolescents and young people which was 24% (189) in comparison to adults which was 9% (117). Thus there was found that COVID-19 vaccination was higher among adults living with HIV aged 25+ compared to adolescents and young people living with HIV. Qualitative thematic analysis of text comments from in-depth interviews revealed that COVID-19 vaccination messaging was mostly targeted at the older age bands, hence this outcome. This finding is in line with other studies have found age as an important predictor to COVID-19 vaccination among the general population (Cook et al., 2022; Wong et al., 2021). In the United Kingdom as well age was found to be linked to lower levels of COVID-19 vaccine hesitancy as the age increases (Cook et al., 2022). In Hong Kong, COVID-19 vaccination acceptance rate was the highest in adults aged 18 to 24 and then this increased with age. There thus need to ensure targeting of younger age bands in COVID-19 vaccination promotion activities particularly for those living with HIV.

8.3.2 Sex

Regarding sex, the study found, being adult male 25+ was significantly associated with less likelihood of utilization of TB Preventive therapy among people living with HIV. Other studies have also found females having more health seeking behaviors than men. In South Africa , the female sex was an important independent factor associated with increased HIV testing and

counselling (Mendelsohn et al., 2018). More so, in the COVID-19 setting, a study in Bangladesh revealed that women had better health seeking behavior than men (Mou et al., 2022). Regarding COVID-19 vaccination, the study did not find sex as significant in defining the utilization of COVID-19 vaccine among people living with HIV. This therefore calls for the need not to leave men behind in designing public health interventions aimed at promoting the use of different services including HIV services. However, the finding was contrary to other studies which have found males as being likely to be vaccinated more than females (Ayele et al., 2021; Kassaw & Shumye, 2021; McAbee et al., 2021).

8.3.3 Marital status

The study found that being unmarried was significantly associated with less likelihood of utilization of TB preventive therapy and TB screening services. The findings of this study therefore support the findings from other studies that marital status is an important factor of health utilization (Pandey et al., 2019; Schoenborn, 2004). It can be assumed that married people are likely to prioritize their health outcomes more than the unmarried. Hence in this instance married people living with HIV would prioritize their health by trying all means possible to access their HIV services despite the challenges brought by COVID-19. More so it is also possible that married couple act as a reminder to each other regarding clinic appointments. There is also a differentiated service delivery approach called Family ART refill groups in Zimbabwe which may explain why married people ferry better in accessing HIV services than the unmarried. Through this model the family members access the HIV services at once.

8.3.4 Education

In this study education was found as not a significant factor across the access of all HIV services such as ART refill, Viral load monitoring, TB preventive therapy and TB screening. In the in-depth interviews as the interview probed for education as factor only 20% of interview thought that education was an important factor in defining the utilisation. Education was also found not statistically significant in other health utilization studies such as in a study among migrants in Beijing (Shao et al., 2018). This was however contrary to the results of an online study across 9 countries which found that people with lower levels of education were less likely to get tested for COVID-19 although there were at higher risk for COVID-19 infection (Pengid et al., 2022). In Ghana, educational attainment strongly predicted a tendency of HIV testing and counselling among women in Ante natal care (Sambah et al., 2020). In Tanzania, women who had attained primary and higher education, were likely to attend one or more Ante natal visits (Rwabilimbo et al., 2020).

However, the study found that education was a significant factor in predicting COVID-19 vaccination among people living with HIV. The study found that people who had attained primary education as their highest qualification were less likely to be vaccinated for COVID-19. This finding is consistent with other studies which have noted that countries that have higher education levels tend to also have a faster influenza vaccination pace (Damiani et al., 2007; Takayama et al., 2012). More so regarding COVID-19, data from 118 countries showed that vaccination coverages were highest in countries with higher levels of education (Ngo et al., 2022). Therefore, in the long term there is need to ensure there is sustainable investments in education across all group including children living with HIV.

8.3.5 Religion

The study found being Pentecostal/protestant as significant in less likelihood of utilizing ART drug refills. More so being a roman catholic had a less likelihood of utilizing viral load monitoring. Religion has been documented as an important factor in health utilization (Chatters, 2000; Ha et al., 2014). The findings also coincides with findings of a study in Zimbabwe where women and families from the Apostolic sect have been noted to have fared less in maternal and child health services (Ha et al., 2014). Religion could have been an important predictor for non-utilization of some of the HIV services as in some instances COVID-19 had been tied with religious sentiments, in some cases contemplating the end of the world. This could have been a reason why some individuals would not priorities routinely accessing their HIV services in the midst of the pandemic. More so, the study found religious reasons contributed to the second top majority reasons (22%) for not getting vaccinated among the study participants. This coincides with other studies which have recognized religion as having an effect in vaccine hesitancy (Chu et al., 2021; Galang, 2021; Jones, 2022).

8.3.6 Vaccinated for COVID-19

As a predisposing factors, being vaccinated for COVID-19 was significantly associated with high likelihood of utilisation of viral load monitoring, TB preventative therapy and TB screening. This finding therefore followed that, those people who had taken the COVID-19 jab would routinely access their HIV services as well. This could be attributed to health seeking behaviours. Chances are that people living with HIV who utilised the opportunity to get COVID-19 vaccinated quicker, are also the ones that routinely access their HIV services such as viral load monitoring, TB preventative therapy and TB screening.

8.4 Need Factors

8.4.1 Pregnancy

The study found that 17% (196/1155) of the females living with HIV that participated in the study had been pregnant during the COVID-19 period. Of these females living with HIV who were pregnant in the COVID-19 period, 5% (10) missed their ART drug refill appointments, 10% (19) missed their viral load monitoring, 14% (27) had not received their TB preventive therapy and 23%(46) did not get TB screened. It is critical particularly for females living with HIV not to miss the above services so as to thwart mother to child transmission and also ensure health delivery by the mothers. Having 10%+ of the pregnant females living with HIV miss their viral load monitoring, TB screening among other services posed a risk towards the unborn babies. It was mentioned through in-depth interviews with community volunteers that, the community follow up which were halted during the COVID-19 pandemic opened the gaps which usually who be prevented with community tracking in the pre-COVID-19 era. The importance adherence to ART and viral load monitoring in pregnant women living with HIV is emphasised in literature (Cohen et al., 2016; Maartens et al., 2014; Myer et al., 2017; Tubiana et al., 2010).

The study found that 29% of females living with HIV who were pregnant during the COVID-19 pandemic period not vaccinated. COVID-19 vaccination hesitancy which had already been there among people living with HIV would further be compounded by pregnancy. Generally, the fears that vaccination may harm the unborn child would make making the choice of vaccination during the pregnancy a difficult decision to make. Vaccine hesitancy amongst pregnant women has been

found to be a concern during past epidemics. and particularly for COVID-19 (Mhereeg et al., 2022; Smith et al., 2022; Uludağ et al., 2022). Although quantitative analysis did not show the significance of pregnancy in accessing services, it was mentioned as a factor that would delay access to service. This was so as it was unclear for example in the first days for pregnant women to access vaccination. Hence this would further be compounded if the women are HIV positive.

8.4.2 Opportunistic infections

The study found that having suffered an opportunistic infection was a significant undesirable push factor to accessing HIV services during the COVID-19 pandemic. 11% (247/2175) of the people living with HIV who participated in the study experience an opportunistic infection in the COVID-19 period. Literature has documented the need to ensure people living with HIV access their ART in time, undergo TB preventative therapy among others as a way of preventing opportunistic infections. In this study, opportunistic infection as a need factor was significantly associated with high likelihood of utilisation of viral load monitoring and TB screening services. This follows that after having an opportunistic infection, there is need firstly for a targeted viral load test and screening out the possibilities of having TB. Hence the study found a high likelihood for people living with HIV who have had an opportunistic infection to have been in contact with the health facility and utilised HIV services. However, in terms COVID-19 vaccination among people living with HIV, having had an opportunistic infection was not a statistically significant factor in multivariate analysis although it was significant in bivariate analysis. 15% (36/247) of people living with HIV who had an opportunistic infection had not yet been vaccinated for COVID-19. Unlike in accessing HIV services, the opportunistic infections were not as significant in pushing for COVID-19 vaccination utilisation.

8.4.3 COVID-19 infection

The study found that 14% (314/2175) of the people living with HIV who participated in the study had a previous COVID-19 infection history. Although this is so, COVID-19 infection history had no significant association with accessing HIV services or COVID-19 vaccination. However, challenges by those infected with COVID-19 included missing their clinic appointments to access HIV services because they were isolating due to COVID-19. This reason could be that it was difficult even to have even Community ART refill group members assist you in collecting and delivering ART drugs due the COVID-19 lockdowns. More so another reason could be that, in instances where disclosure of HIV status may not have happened among family members taking care of the individual living with HIV who would be infected with COVID-19, ART drug refill appointments would be easily missed. The issues of disclosure were found to be important in reducing ART adherence in a study in Ethiopia in the pre-COVID-19 period (Letta et al., 2015).

8.4.4 Contact of a COVID-19 case

The study found that 19% (417/2175) of the people living with HIV who participated in the study had been a contact of a COVID-19 case. Although this is so, being a contact of a COVID-19 case had no significant association with accessing HIV services or COVID-19 vaccination. However, regarding the challenges among contacts of a COVID-19 case it was revealed by community HIV volunteers that this was a barrier. This reason could be that people living with HIV who were contacts were afraid of visiting the facility and being screened and probably tested positive for COVID-19 being isolated at the facility. There was general fear among people to know their COVID-19 test results. Hence this would have caused people living with HIV who were contacts to delay accessing health services at the facility till they feel the confidence they are not

COVID-19 infected in around an average of three to four weeks. Missing ART drugs for these periods of more than 28 days will intern increase the individuals viral load to increase which is a blow to the control of the HIV epidemic.

8.5 Environmental Factors

8.5.1 Residence

The study findings revealed that residence was an important factor in defining utilization of HIV services in the advent of COVID-19. Unlike in pre-COVID-19 era where utilisation of services was better in urban areas, the study found that this was changed during the COVID-19 period. There was a higher likelihood to utilisation HIV services in the rural areas than urban areas for ART drug refill, viral load monitoring, and TB preventative therapy. In-depth interviews this was noted to be as a result of the fact that COVID-19 infection were rife in urban areas as compared to rural areas. This result was also similar to a study in Rwanda which found residence being significant in the access to ART drug refills (Pierre et al., 2020). The study also found that being in a rural area was significantly associated with higher odds of COVID-19 vaccination among people living with HIV in comparison with their urban counterparts. This was consistent with a study in China which individuals residing in urban areas where more hesitant to be vaccinated as opposed to those in rural areas (Wu et al., 2023). However other studies saw better COVID-19 coverages in urban areas than in rural areas (Saelee et al., 2022; Sun & Monnat, 2022).

8.5.2 Type of Health facility

Accessing services at District health facility were associated with high likelihood of utilisation of ART drug refill and TB screening among people living with HIV. Accessing services at Primary

health facility was significantly associated with high likelihood of utilisation of TB screening. The reason maybe that Primary health facilities are usually closer to communities. It is thus possible that the people living with HIV would have less challenges in getting access to the health facility. This is unlike the bigger provincial health facilities which are usually far for the majority. The bigger health facilities would therefore only be accessed based on referral on complicated situations or emergencies needing specialist attention.

8.6 Enabling Factors

8.6.1 COVID-19 lockdown restrictions

The study found that among people living with HIV who had interruptions in accessing HIV services, COVID-19 lockdown restrictions was noted as one of the major reasons for not accessing ART drug refill, viral load monitoring, TB preventative and TB screening. This is consistent with various studies which documented how the COVID-19 restrictions were a barrier to access of HIV services (Assefa, Soura, et al., 2021; Dear et al., 2021). COVID-19 restrictions affected access in various ways as also explained in in-depth interviews. COVID-19 restrictions made it difficult particularly for people living with HIV who were used to accessing their ART in various differentiated care services such as Community ART refill groups. Such platforms were not easy to convene due to COVID-19 restrictions. Although movement to access health services was not restricted, however the fear of being questioned by law enforcement agents made it difficult for other people to prioritise accessing their routine HIV services.

8.6.2 COVID-19 transport challenges and distance

COVID-19 transport stoppages were not significant in increasing the odds of HIV services utilization in the advent of COVID-19 according to this study. However, transport stoppages and difficulties in accessing transport have documented as crucial to utilisation of health services in other studies (Van Staden et al., 2022). Although this was so, the study through qualitative interviews found that although it did not actually impede actual access to the health facility, it posed a difficult barrier. Routine transport was not available therefore in some instances individuals had to walk long distances in order to ensure they do not miss their clinic appointments. The study found that transport cost to the health facility were not significant in increasing the odds of HIV services utilization in the advent of COVID-19. This is however not consistent to previous studies which have documented transport issues as affecting health services (Syed et al., 2013). Transport cost to vaccinated site contributed 1% to not getting vaccinated. This was consistent with another study in the United States in transport cost was less commonly stated a barrier in resource limited settings areas (Spees et al., 2023). However, issues of the effects of transportation barriers to access COVID-19 vaccination have been documented (Harkness et al., 2020; Moore et al., 2022).

Distance to health facilities was found statistically significant only among adults 25+ for less likelihood of utilisation of viral monitoring services. This was not consistent with a study in Uganda which found distant statistically insignificant but the WHO staging and obesity as significant (Emmanuel et al., 2022). Distance to vaccination site contributed 2% of those not getting vaccinated.

8.6.3 Fear of contracting COVID-19

The fear of contracting COVID-19 among people living with HIV was significantly associated with high likelihood of utilization of ART drug refill, viral load monitoring, TB preventative therapy and TB screening. In Nigeria and Kenya, the fear of COVID-19 infection were among the reasons that impacted access to services during the COVID-19 era (Ahmed et al., 2020). Thus there was a fear of unintended consequences of COVID-19 among people living with HIV. This therefore was a significant factor in ensuring that or HIV services are met so as to be stronger in case of getting COVID-19 infected. More so, being unsure if people living with HIV should get vaccinated contributed 15% to not getting vaccinated.

8.6.4 Health care services

Non-availability of community health care services only among adults 25+ was statistically significant for less likelihood of utilisation of viral monitoring services. Services such as viral load monitoring in various communities were now being offered through community outreach services. During COVID-19 these services were halted therefore bringing in a gap in access to the service. COVID-19 related stigma among health care workers was not found statistically significant in affecting utilisation of HIV services in this study. This may coincide with literature as well as, most studies have actually documented that it is the health workers who have actually faced stigma (Bagcchi, 2020; Jain et al., 2021; Nashwan et al., 2022).

8.6.5 Fear of side effects

The study found that the fear of side effects contributed to the majority of reasons for not getting vaccinated. This was however in contrast with a study in Nigeria, where vaccine acceptance among

people living with HIV was lower on people who were not concerned about side effects (Iliyasu et al., 2021). However, the study findings were consistent where it also found that doubts by people living with HIV are supposed to take the vaccine in fear of antiretroviral treatment and COVID-19 vaccine interactions. This was also consistent with studies among people living with HIV in middle east and North Africa, in which concerns related to side effects, and potential interactions between antiretroviral treatment were raised (Cordie et al., 2021, Huang et al., 2021). In Zimbabwe and South Africa, a study ascertained that people living with chronic conditions had fears of getting vaccinated (Myburgh et al., 2023).

8.7 Strengths and Limitations of the Study

In terms of limitations, it is important to note that participants in this study do not reflect the entire population of people living with HIV. Moreso, the study outcomes were based on self-report. The study's main strength was that it used a relatively representative sample of more than 2 000 people living with HIV. The effect of vaccinations starting with adults interfered with the uptake among adolescents as participants in this study. However, I appreciate that at the time of interviews, the space had been opened up to include school children 15+years and this included the 15–17 age group who may have been initially side-lined. The factors that were selected to be predisposing, enabling, need and environmental cannot be declared as comprehensive for the overall HIV services utilization in the COVID-19 pandemic period. There can be other factors which can be added on this Anderson model to depict HIV service utilization.

CHAPTER NINE: CONCLUSIONS AND RECOMMENDATIONS

9.1 Introduction

This chapter comprises of three sections. The first section of this final chapter summarizes the research report through highlighting key findings of this HIV and COVID-19 intersections study. The second part concludes the report highlighting contributions to knowledge and the third part provides recommendations. The summary of the findings and the conclusion are based on the four research objectives and recommendations are based on what the researcher considered worth to act upon for guarding against threats to HIV epidemic control such as COVID-19. Considerations for future research are also presented in this Chapter.

9.2 Summary of Findings and Conclusions

The research findings managed to answer the research question: Is/did the COVID-19 pandemic intensify barriers and redefine the utilisation of HIV treatment services among people living with HIV on antiretroviral viral therapy (ART) in Zimbabwe? First, the study ascertained that COVID-19 intensified barriers to accessing HIV services as COVID-19 lockdown restrictions was the major reason among people living with HIV who missed their ART drug refills, viral load monitoring, TB preventative therapy and TB screening. Second, the factors associated with utilisation of HIV services showed that there was redefinition of significant factors as utilisation was better in rural areas than urban areas regardless of rural barriers such as distance. The urban settings, which were hard hit by COVID-19, presented many more barriers than urban areas. In addition, factors such as the fear of COVID-19 became significant factors with regard to utilisation of HIV services.

Regarding the first objective which meant to examine the effect of the COVID-19 outbreak on the utilization of HIV treatment services in Zimbabwe since the outbreak. The study found that TB screening services had relatively lower utilization of 83% and above and below 90% for TB preventive therapy across all predisposing, need and environmental factors. COVID-19 lockdown restrictions were noted as the major reason for not utilizing ART drug refill, viral load monitoring, TB preventive therapy and TB screening among people living with HIV.

The second objective of this study was to explore the predictors of continued utilisation of HIV treatment services since the COVID-19 outbreak among people who are living with HIV on ART in Zimbabwe and the third objective analysed differences of the predictors by age. Regarding the multivariate associations with predisposing factors, the utilisation of ART drug refill services was significantly associated with ages 15–24, 35–44, 45+, being adult male aged 25+ on comparison between adolescents and young people and adults and being Pentecostal/Protestant. On utilisation of viral load monitoring services, ages 15–24, 35–44, 45+, being adult male 25+ on comparison between adolescents and young people and adults, being Roman Catholic and being vaccinated were significantly associated. On utilisation of TB preventative therapy, ages 15–24, 35–44, 45+, being adult male 25+ on comparison between adolescents and young people and adults, being unmarried, being vaccinated for COVID-19 were significantly associated. On TB screening services, ages 15–24 and 35–44, being unmarried, being in other religions and being vaccinated were significantly associated.

Regarding enabling factors, distance to health facility was statistically significant to utilisation of ART drug refills among adults aged 25+. Transport cost to health facility was statistically

significant to utilisation of ART drug refills as well. Fear of contracting COVID-19 was statistically significant across the utilisation of ART drug refills, viral load monitoring, TB preventative therapy and TB screening. Non-availability of community health services was statistically significant in accessing viral load services among adults aged 25+ and also for TB preventative therapy. Regarding need factors, having an opportunistic infection in the COVID-19 restriction periods was significantly associated with higher odds of accessing viral load monitoring and also TB screening. Regarding environmental factors, residence and type of health facility was statistically significant at bivariate analysis and also in the below services at multivariate analysis. Regarding need factors, adults who had an opportunistic infection was significantly associated with higher odds of viral load monitoring among people living with HIV. However, among adolescents and young people, there was no significant association. Regarding environmental factors, adults residing in a rural area was significantly associated with higher odds of viral load monitoring among people living with HIV in comparison with their urban counterparts. However, among adolescents and young people, there was no significant association.

The fourth objective sought to examine COVID-19 vaccination among people living with HIV. The study found a higher proportion of utilisation of COVID-19 vaccination among adults 25+ which was 91% (1249/1366) in comparison to adolescents and young people. Fear of side effects contributed to the main (48%) reason for not getting vaccinated among the study participants. Older ages, 35–44 and 45+ were associated with higher odds of COVID-19 vaccination among people living with HIV in comparison with the 20–24 age group. People living with HIV in which primary level education was their highest level was significantly associated with less likelihood of getting the COVID-19 vaccination in comparison with their secondary level counterparts.

Regarding need factors, being in previous contact with a COVID-19 case was significantly associated with higher odds of getting the COVID-19 vaccination in comparison with not getting vaccinated. Regarding environmental factors, being in a rural area was significantly associated with higher odds of COVID-19 vaccination among people living with HIV in comparison with their urban counterparts.

9.3 Conclusions

This study provides an understanding about how predisposing, need, environmental and enabling factors are associated with defining the utilisation of HIV services during the COVID-19 period. The study also provided reasons from the people living with HIV on what factors were barriers to accessing HIV services after the advent of COVID-19. COVID-19 vaccination among people living with HIV was also explored and the reasons behind hesitancy. The study provides a framework of factors to look at when designing public health programmes, so as to look at the approaches holistically through models such as the Anderson Health utilisation model.

9.4 Policy Implications

There is now more than ever a greater focus on the global effort to end the HIV/AIDS epidemic through achieving epidemic control. There is thus the need to ensure that there is access and uptake of HIV treatment services for all populations across ages, gender, religions and localities, including those most vulnerable, despite the challenges proffered by new disease emergencies. International organisations such as UNAIDS and United States PEPFAR are supporting the implementation of strategies to fast track epidemic control through reaching key populations among others. The Zimbabwe Ministry of Health and Child Care has affirmed its commitment to epidemic control in

the country. It is thus imperative that the implications of COVID-19 on HIV treatment that was investigated provide useful information on utilisation predictors in times of intersecting epidemics that the HIV response also needs in running the last mile of achieving epidemic control.

Most importantly, the results of the multivariate regression analysis showed that there were higher odds of accessing HIV services in the advent of COVID-19 among older age bands as compared to adolescents aged 15–19. This finding raises a significant public health concern; therefore, to achieve HIV epidemic control, there is a need to prioritise interventions for adolescents to always keep the utilisation of health services in this age group in check.

Although the severity of the COVID-19 pandemic has dwindled, COVID-19 appears to come and go in waves, and some countries are still experiencing relatively high cases. It is therefore likely that the factors associated with the utilisation of HIV services identified by study age, residence, type of health facility and fear of contracting COVID-19 among others need to be included when planning for improved access to health utilisation. In the event of any disease outbreak, these factors may need to be prioritised in crafting informed public health responses. In terms of limitations, it is important to note that participants in this study do not reflect the entire population of people living with HIV. The study's main strength was that it used a relatively representative sample of more than 2 000 people living with HIV.

The study found that vaccine coverage was 86% among the people living with HIV who were enrolled in the study. A higher proportion of people who were not yet vaccinated for COVID-19 was among adolescents and young people which was 24% (189) in comparison to adults which was 9% (117). The fear of side effects was noted as the main reason for not utilising the COVID-19 vaccine. In terms of differences by age in the multivariate analysis, residence, type of health

facility and being in previous contact with a COVID-19 case were significantly associated with getting vaccinated among adults (25+) and not associated among the adolescents and young people (15-24).

9.5 Recommendations

The researcher recommends the following:

- The government should deliberately design and implement health promotional programmes that promote COVID-19 vaccination particularly among people living with HIV
- The results showed higher odds of accessing HIV services and COVID-19 vaccination among people living with HIV among older age bands as compared to adolescents aged 15-19 during the COVID-19 pandemic. This finding raises a significant public health concern that to achieve HIV epidemic control, there is a need to prioritize interventions for adolescents and young people living with HIV. There is thus need to always keep utilization of health services in this age group in check.
- The study found a lower proportion of utilization of COVID-19 vaccination among adolescents and young people which was 24% (189) in comparison to adults which was 9% (117). This calls for the need to deliberately target the younger age bands living with HIV with vaccine information to improve uptake across or sub-populations. There is need for public health programmes to target families, communities, health care workers in

ensuring adolescents and youth friendly information and support for caregivers for information and support for COVID-19 vaccinations.

- Sustained investment in community health is of paramount importance. Non-availability of community health work during the COVID-19 pandemic had an effect on utilization of HIV services
- There is need for COVID-19 vaccinations to be targeted in religious gatherings as religious reasons contributed to the second majority why people living with HIV were not vaccinated.
- Specific efforts should be made for the monitoring and evaluation system to track COVID-19 vaccine coverages among different sub population groups such as people living with HIV and key populations.

9.6 Contributions to knowledge of the study

This study on the utilisation of HIV services makes two unique contributions to the research literature. First, previous studies on difficulties in accessing HIV services during the COVID-19 pandemic have largely focused on documenting the effect of COVID-19 without exploring the predictors that defined utilisation of the services in the advent of COVID-19 (Assefa et al., 2021; Dear et al., 2021; Lagat et al., 2020; Lungu et al., 2022; Pierre et al., 2020; Umvilighozo et al., 2020). This study provides understanding about how predisposing, need, environmental and enabling factors are associated with defining the utilisation of HIV services during the COVID-19 period. Second, the study provides reasons from the people living with HIV on what factors were barriers to them accessing HIV services after the advent of COVID-19.

9.8 Relevance of the Anderson Model of Health utilisation

This study was premised under the Anderson Health utilisation model. This model was used as the coming in of COVID-19 to an already existing HIV epidemic need an approach which takes into consideration different factors. Hence the predisposing, need, enabling and environmental factors were taken into consideration. This model contributed to the framing of the four hypothesis of this study. The study found that in each of the predisposing factors, need, enabling and environmental factors there were factors that were significant at some point in predicting utilisation of HIV care treatment services and also COVID-19 vaccination among people living with HIV. The model remains crucial in defining utilisation of health services hence the need to identify the critical predisposing, enabling, need and environmental factors in designing of public health programmes.

9.9 Relevance to Demography and Population studies

This study was relevant to the discipline of Demography and population in mainly two ways. Firstly, this study was focused on a key population group which people living with HIV. There was also a great need to understand vaccine coverages among people living with HIV and reasons behind. The study realised that the fear that COVID-19 vaccination would have more side effects to people living with HIV was noted by the study. These are population specific findings which are to ensure that public health response initiatives address all parts of the population. Secondly, the study went on differentiate the predictors of utilisation of HIV services and COVID_19 vaccination among people living with HIV by age. The study found less utilisation of the COVID-19 vaccination among adolescents and young people aged 15-24 in comparison with adults 25

years and older. This calls for the need to ensure COVID-19 vaccination approaches need to target the younger age bands so as to achieve full COVID-19 vaccination coverages.

9.10 Future Research

Future studies may be conducted to evaluate the effectiveness of interventions implemented during the COVID-19 pandemic in terms of guaranteeing the utilisation of HIV services. In addition, there is a need to keep researching the effectiveness of the COVID-19 vaccination promotion activities among people living with HIV. Future studies may also need to integrate how emerging predictors such as mental health among people living with HIV weigh in on the utilisation of HIV services, particularly during crises such as COVID-19.

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APPENDICES

Appendix A01: Policy Document

POLICY BRIEF

Intersecting Epidemics: The implications of COVID-19 in the utilisation of HIV treatment services among people living with HIV on antiretroviral treatment (ART) in Zimbabwe.

By

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Policy Users: Ministry of Health and Child Care, National AIDS Council, Ministry of labour, public and social services, World Health Organisation, Zimbabwe National Network for people living with HIV.

Introduction

This policy brings to attention the findings and policy recommendations that emanated from the study that into the intersections between COVID-19 and HIV in terms utilisation of HIV among people living with HIV in Zimbabwe. The purpose of the policy brief is to bring this to the attention of policy makers and public health practioners on the need to learn from intersecting epidemics and how to better able to react so as to avoid double burdens.

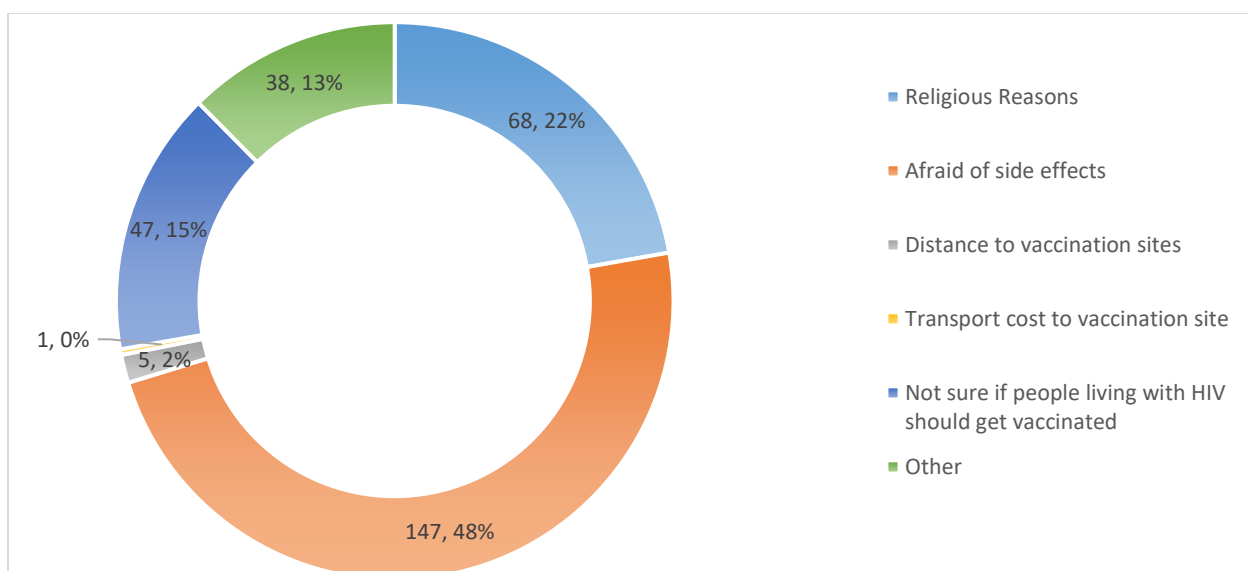
Context

Zimbabwe has been working towards the last mile of controlling the HIV epidemic where the retaining of people living with HIV on antiretroviral therapy (ART) is primarily important. More so, ensuring they are virally suppressed and thwarting opportunistic infections is key. The outbreak of COVID-19 potentially posed a threat to derail or reverse the gains attained in the fight against HIV. Zimbabwe has an estimated 1.3 million people living with HIV (UNAIDS, 2020). Since the outbreak of the COVID-19 Pandemic the country has recorded more 260 000 cases of COVID-19 (MOHCC, 2023). The question: Is/was the COVID-19 pandemic intensifying barriers and redefining the utilisation of HIV treatment services by people living with HIV on antiretroviral treatment (ART) in Zimbabwe? remained largely unanswered in the literature currently available. Thus, the purpose of this study was to examine the implications of COVID-19 in the utilisation of HIV care treatment services among people who are living with HIV on ART in Zimbabwe and the factors associated with it.

Key findings from the study

- The study found that TB screening services had relatively lower utilisation of 83% and above and below 90% for TB preventative therapy across all predisposing, need and environmental factors.
- COVID-19 lockdown restrictions were noted as the major reason for not utilising ART drug refill, viral load monitoring, TB preventative therapy and TB screening among people living with HIV.
- The utilisation of ART drug refill services was significantly associated with ages 15-24, 35-44, 45+, being adult male aged 25+ on comparison between adolescents and young people and adults and being Pentecostal/protestant.
- On utilisation of viral load monitoring services ages 15-24, 35-44, 45+, being adult male 25+ on comparison between adolescents and young people and adults, being Roman Catholic and being vaccinated were significantly associated.

- On utilisation of TB preventative therapy ages 15-24, 35-44, 45+, being adult male 25+ on comparison between adolescents and young people and adults, being unmarried, and being vaccinated for COVID-19 were significantly associated.
- On TB screening services ages 15-24 and 35-44, being unmarried, being in other religions and being vaccinated were significantly associated.
- Distance to health facility was statistically significant to utilisation of ART refill among adults aged 25+.
- Transport cost to health facility was statistically significant to utilisation of ART refill as well.
- Fear of contracting COVID-19 was statistically significant across utilisation of ART drug refill, viral load monitoring, TB preventative therapy and TB screening.
- Non-availability of community health services was statistically significant for accessing viral load services among adults aged 25+ and also for TB preventative therapy.
- Having an opportunistic infection in the COVID-19 restrictions period was significantly associated with higher odds of accessing viral load monitoring and also TB screening.
- Residence and type of health facility were statistically significant at bivariate analysis and also in the HIV services at multivariate analysis.
- Eighty-six percent of the study participants living with HIV had been vaccinated for COVID-19. Among people living with HIV who were vaccinated (n=1,851), the study found a higher proportion of utilisation of COVID-19 among adults 25+ which was 91% (1249/1366) in comparison to adolescents and young people which was 76% (602/791).
- Fear of side effects contributed to the majority (48%) reason of not getting vaccinated among the study participants. This was followed by religious reasons (22%) and then being unsure if people living with HIV should get vaccinated (15%).
- The fear of side effects and religious reasons contributed to a majority of reasons why people living with HIV were not vaccinated.



- Age, 15-24 was significantly associated with less likelihood of getting COVID-19 vaccination in comparison with their 25-34 counterparts. Older ages, age 35-44 and age 45+ were associated with higher odds of COVID-19 vaccination among people living with HIV in comparison with the 20-24 age group.
- People living with HIV in which primary level education was their highest level was significantly associated with less likelihood of getting COVID-19 vaccination in comparison with their secondary level counterparts.
- Being a previous contact of a COVID-19 case was significantly associated with higher odds of COVID-19 vaccination in comparison with not getting vaccinated.
- Environmental factors, being in a rural area was significantly associated with higher odds of COVID-19 vaccination among people living with HIV in comparison with their urban counterparts.

Policy recommendations

- The government should deliberately design and implement health promotional programmes that promote COVID-19 vaccination particularly among people living with HIV.

- The results showed higher odds of accessing HIV services and COVID-19 vaccination among people living with HIV among older age bands as compared to adolescents aged 15-19 during the COVID-19 pandemic. This finding raises a significant public health concern that to achieve HIV epidemic control, there is a need to prioritise interventions for adolescents and young people living with HIV. There is thus need to always keep utilisation of health services in this age group in check.
- The study found a lower proportion of utilisation of COVID-19 vaccination among adolescents and young people which was 24% (189) in comparison to adults which was 9% (117). This calls for the need to deliberately target the younger age bands living with HIV with vaccine information to improve uptake across or sub-populations. There is need for public health programmes to target families, communities, health care workers in ensuring adolescents and youth-friendly information and support for caregivers for information and support for COVID-19 vaccinations.
- Sustained investment in community health is of paramount importance. Non-availability of community health work during the COVID-19 pandemic had an effect on utilisation of HIV services.
- There is need for COVID-19 vaccinations to be targeted in religious gatherings as religious reasons contributed to the second majority why people living with HIV were not vaccinated.
- Specific efforts should be made for the monitoring and evaluation system to track COVID-19 vaccine coverages among different sub-population groups such as people living with HIV and key populations.

Appendix A02: Bio sketch and Professional Development

Biographic Sketch

Talent Tapera is a PhD student under the supervision of Professor Clifford Odimwegwu. Talent holds an MSc in Demography and Population studies from Great Zimbabwe University and also an MSc in Development Studies from National University of Science and Technology in Zimbabwe. Talent has had training and technical experience in implementation, monitoring, evaluation and learning of public health program assignments. Talent has led Monitoring and Evaluation teams in four public health organisations such as Africaid, Organization for Public Health Interventions and development and FHI360. Talent acted as Director Strategic information, Evaluation and learning for ZHI in FY22 in the ACCE project. Talent has also lectured research methodology course at Zimbabwe Ezekiel Guti University in Zimbabwe. Talent research interests include HIV, TB and cervical cancer. Talent has published one paper as first author and co-authored five journal articles. Talent has presented two poster presentations in Kigali, Rwanda at the International Conference on AIDS and STIs in Africa.

Professional Development

1. Reviewer of three manuscripts on health care utilisation for the Population and Reproductive Health Dynamics under COVID-19 in Sub-Saharan Africa conference special journal
2. Emerging Methodologies in Social Science Research [IEMeSSR] Workshop, 10-14 May, 2021

Appendix A03: Literature Matrix

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
Cook et al. 2022	Vaccination against COVID-19: Factors That Influence Vaccine Hesitancy among an Ethnically Diverse Community in the UK	United Kingdom	The study was aimed at examining factors that make people decide to get vaccinates	Males, Females	Online and paper-based survey	1 058	Age and ethnicity were important predictors of COVID-19 vaccination	Study does not have a nationally representative sample of the United Kingdom
Lagat et al. (2020)	Impact of the COVID-19 pandemic on HIV Testing and Assisted Partner Notification Services, Western Kenya	Western Kenya	The study was aimed at investigating the impact of COVID-19 on clinics providing assisted partner notification HIV services in Western Kenya	Males, Females	Retrospective programmatic data	2089 Female indexes	- Partner notification and HIV testing for clients in the community was affected as home testing was halted due to COVID-19 restrictions - Turnaround of viral results increased from 1 to 2 weeks to several months due to diversion of laboratory results for COVID-19 - Reduced opportunities for client and health care worker clinic interactions as	The study relies mostly on programme data and service provider perceptions without interviewing the clients aimed at receiving the services

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
							clients were referred direct to pharmacy for drug pick	
Ponticiello et al. (2020)	Everything is a Mess”: How COVID-19 is Impacting Engagement with HIV Testing Services in Rural South-western Uganda	South-western Uganda	To document the effect of COVID-19 on HIV testing	Males and Female ≥ 18 years	Qualitative in-depth Interviews	20	- In South-western Uganda HIV testing was negatively impacted in two ways which include COVID-19 restriction preventing access of services - It was noted that there was COVID-19 related stigma among the health care workers	The study sample of 20 is relatively too small to generalise the study
Assefa et al. (2021)	Reported Barriers to Healthcare Access and Service Disruptions Caused by COVID-19 in Burkina Faso, Ethiopia, and Nigeria: A Telephone Survey	Burkina Faso, Ethiopia, and Nigeria	To assess the effects of COVID-19 pandemic from the perspectives of the health care workers	Health Care Providers Community Members	Telephone Survey	900 health Care Providers 1797 Community members	Health Care Providers noted that 18% of clients had difficulty accessing HIV treatment	The modality of self-reports used may bring issues of bias

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
Bell et al. (2020)	Predicting the Impact of COVID-19 and the Potential Impact of the Public Health Response on Disease Burden in Uganda	Uganda	To predict the impact of COVID-19 on disease burden	Men, Women	Retrospective Study	-	- A decline in new HIV case identification by 75% in the month of April in 2020 - A decline in the initiation of TB preventative therapy by 75% in the same period	Data analysed was for a short period of time
Umviligihozo et al. (2022)	Sub-Saharan Africa preparedness and response to the COVID-19 pandemic: A perspective of early career African	SSA countries	To document public health interventions implemented in seven sub-Saharan African countries preparing and responding to COVID-19	Men, Women	Review of publicly available information	-	Cervical cancer, Prep, ART and TB programmes were affected by COVID-19	
Dear et al. (2021)	Transient Reductions in Human Immunodeficiency Virus (HIV) Clinic	Nigeria, Kenya, Tanzania and Uganda	To observe the decreases in clinic visits in the HIV facility	Men, Women	cohort study	2666	- A decline in ART adherence was recorded - People living with HIV were less likely to be	The participants that were enrolled had a unique access to care their

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
	Attendance and Food Security During the Coronavirus Disease 2019 (COVID-19) Pandemic for People Living with HIV in four African Countries						adherent to HIV clinic visits	findings may not be generalisable
Harris et al. (2021)	Effects of the Coronavirus Disease 2019 Pandemic on Human Immunodeficiency Virus Services: Findings from 11 Sub-Saharan African Countries	SSA countries	To document the effect of COVID-19 on HIV service provision	Men, Women	Retrospective cohort study	1 059	Although there was quick recovery, a transient decline in HIV testing and ART was noted	Facilities sampled may not be enough to generalise findings for the 11 countries data was collected from

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
Ahmed et al. (2020)(Ahmed et al., 2020)	Impact of the societal response to COVID-19 on access to healthcare for non-COVID-19 health issues in slum communities of Bangladesh, Kenya, Nigeria and Pakistan: results of pre-COVID and COVID-19 lockdown stakeholder engagements	Bangladesh, Kenya, Nigeria and Pakistan	To compare access to Health care for non-COVID-19 conditions in the pre and post COVID-19 periods in slum communities	Men, Women	Qualitative stakeholder engagements	860 community leaders, residents and health care workers	TB and HIV services were impacted by COVID-19	The study is based on perspectives of the stakeholders
Thirumalaisamy et al. (2021)	COVID-19 and syndemic challenges in 'Battling the Big Three': HIV, TB and malaria	Sub-Saharan Africa	To bring the effects of COVID-19 on Africa with already high incidences of HIV, TB and Malaria	Male, Female	Desk review	-	The study predicted an intensification of the burden of HIV ,TB and malaria if COVID-19 cases are not contained	The study is a desk review
Chanda-Kapata et al. (2022)	Tuberculosis, HIV/AIDS and Malaria	Sub-Saharan Africa	To explore the COVID-19	Male, Female	Desk review	-	COVID-19 led to HIV and malaria resources diversion	The study is a desk review

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
	Health Services in sub-Saharan Africa –A Situation Analysis of the Disruptions and Impact of the COVID-19 Pandemic		disturbances on HIV and malaria					
Wong et al (2021)	Acceptance of the COVID-19 vaccine based on the health belief model: A population-based survey in Hong Kong	Hong Kong	To examine the factors associated with acceptance of vaccine based	Male, Female aged 18 and older	Random telephone survey	1200	The COVID-19 vaccination acceptable was higher in adults aged 18 to 24 years then increased with age	There is a possibility of selection bias as they used landline. However the although note that 91% of people in Hong Kong have access to landlines
Coker et al. (2021)	Things must not fall apart: the ripple effects of the COVID-19 pandemic on children in sub-Saharan Africa	Sub-Saharan Africa	To highlight the impacts of covod-19 on Children in sub-Saharan Africa	Children	Desk review	-	The study noted the highly likelihood of pandemic restrictions and service disruptions as impacting children living with HIV services such as adherence and counselling and other	The study is a desk review

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
							mental health support initiatives	
Britta et al. (2020)	Understanding the impact of interruptions to HIV services during the COVID-19 pandemic: A modelling study	SSA countries	To explore effect of COVID-19 on HIV	Mathematical modelling	Use of a mathematical model to examine how impact is affected by model assumptions	-	Three-month interruption of COVID-19 could cause a 40% decrease and have same impact on deaths	The model did not take into consideration any interaction between HIV, or ART status and COVID-19 infection
Dorward et al.(2021)	The impact of the COVID-19 lockdown on HIV care in 65 South African primary care clinics: an interrupted time series analysis	South Africa	To document the impact of COVID-19 lockdown on HIV services	Males, Females	Time series analysis	-	- More than 45% decrease in HIV testing - Decrease in ART initiations - improved towards pre-lockdown levels	The study did not take into account influences on viral load to complete the HIV care continuum
Jewell et al.(2020)	Potential effects of disruption to HIV programmes in sub-Saharan Africa caused by COVID-19: results	Sub-Saharan Africa	To predict the effect of COVID-19 on HIV programmes	Males, Females	Mathematical modelling	-	disturbances to condom supplies may increase HIV incidence	The models outputs where depended on the data that was available which

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
	from multiple mathematical models							may have not been always compete
Davey et al. (2020)	Contracting HIV or Contracting SAR-CoV-2 (COVID-19) in Pregnancy? Balancing the Risks and Benefits	South Africa	To document the Risk and benefits of contracting HIV or COVID-19 in pregnancy	Male, Female	Desk review	-	HIV preexposure prophylaxis (PrEP) in pregnancy had been halted	The study is a desk review
Pierre et al. (2020)	Attendance to HIV Antiretroviral Collection Clinic Appointments During COVID-19 Lockdown. A Single Centre Study in Kigali, Rwanda	Rwanda	To document attendance on HIV collection during the COVID-19 lockdown	Male, Female	Retrospective study	382	Residence as a factor was significant in determining utilisation of HIV service during the COVID-19 pandemic	The study is a single centre study, hence maybe difficult to generalise the study
Stover et al. (2020)	Estimation of the Potential Impact of COVID-19 Responses on the HIV Epidemic: Analysis using the Goals Model	Malawi, Mozambique, Uganda, Zimbabwe	To analyse effects of COVID-19 to HIV	Male, Female	Study applied an existing HIV simulation model	-	Disturbances in prevention programmes may have a short while effect in increase new infections	

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
Snyman et al.(2021)	COVID-19 in Africa: pre-existing immunity and HIV	Africa	To highlight the impact of COVID-19 on people living with HIV	Male, Female	Desk review	-	The impact of HIV on COVID-19 infection is not yet fully ascertained	The study is a desk review
Mwananyanda et al. (2021)	COVID-19 deaths in Africa: prospective systematic post-mortem surveillance study	Zambia	To highlight the effect of COVID-19 on urban population of Africa	Male, Female	Cross-sectional study		The study identify commodities that top COVID-19 deaths as TB, HIV, diabetes , alcohol misuse and hypertension	The study was limited by the completeness of available data
Fernandez et al(2021)	HIV treatment/retention in sub-Saharan Africa before and during the COVID-19 pandemic	Sub-Saharan Africa	To assess HIV interruption in treatment during the COVID-19 pandemic	Male, Female	Cross-sectional study	740,112	The proportion of ART clients who were lost to follow up in 18 countries of SSA in the year 2020	
Murewanhema (2020)	HIV and Sub-Saharan African Women in the	Sub-Saharan Africa	To highlight factors that put women at risk during the	Women	Desk review	-	Risk of HIV acquisition higher	The study is a desk review

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
	COVID-19 Era and beyond		COVID-19 pandemic				among adolescents and young women	
Nepomuceno et al.(2020)	Vulnerable groups at increased risk of COVID-19 in sub-Saharan Africa: The case of the HIV population	Sub-Saharan Africa	To highlight the potential risk profile for COVID-19 in countries with high prevalence rates	Males, Females	Retrospective	-	- People living with HIV are potentially at greater risk of dying to COVID-19 considering it is so due to influenza - HIV-infected population are potentially a vulnerable group at increased risk of COVID-19	The study pillars on inferring to previous finding for example on the risk on influenza on the HIV population, and no actual data collected on risk of COVID-19
Himwaze et al. (2021)	Postmortem examination of Hospital Inpatient COVID-19 Deaths in Lusaka, Zambia - A Descriptive Whole-body Autopsy Series	Lusaka, Zambia	To examine people who passed on due to COVID-19	Males, Females, Aged 15-85	Descriptive post-mortem examination	29	Among the 29 autopsies, common comorbidities included HIV were 28% (8/29)	The study sample of 29 is relatively small to generalise the findings elsewhere

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
Bell et al. 2021	Relative Burdens of the COVID-19, Malaria, Tuberculosis, and HIV/AIDS Epidemics in Sub-Saharan Africa	SSA countries	To examine the burden of COVID-19, as it relates to HIV, TB and malaria	Men, Women	Retrospective Study	1,523,187 (all mortality)	HIV, TB and malaria dominated mortality due to COVID-19	The data analysis may be marred with some completeness issues as COVID-19 mortality data is incomplete
Mandala et al. (2021)	SARS-CoV-2 and HIV-1: Should HIV-1-Infected Individuals in SSA Be Considered a Priority Group for the COVID-19 Vaccines?	Sub-Saharan Africa	To find out if people living with HIV should be a Priority Group for the COVID-19 Vaccines?	Men, Women	Desk review	-	There is need of prioritising COVID-19 vaccination for people living with HIV	It is a desk review
Boulle et al. (2020)	Risk Factors for Coronavirus Disease 2019 (COVID-19) Death in a Population Cohort Study from the Western Cape Province, South Africa	South Africa	To examine risk factors for COVID-19 death for people living with HIV	Men, Women	Population cohort study	3,460,932	HIV is associated with COVID-19 mortality	The study lacked data for other risk factors such socioeconomic status and smoking

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
Venturas et al. (2021)	Comparison of outcomes in HIV-positive and HIV-negative patients with COVID-19	South Africa	To ascertain whether people living with HIV are affected more with COVID-19	Adults - HIV positive and HIV negative	Retrospective analysis	384 (108 HIV-Positive and 276 HIV-negative)	Although not statically significant people living with HIV died a bit younger than those with HIV	The data referred to only hospitalized cases
Anjorin et al. (2021)	Comorbidities and the COVID-19 pandemic dynamics in Africa	Africa	To explore comorbidities of COVID-19	Male, Female	Desk review	-	The study noted no existing epidemiological relation between COVID-19 and HIV	The study is a desk review
Govender et al. (2020)	Systemic DPP4/CD26 is associated with natural HIV-1 control: Implications for COVID-19 susceptibility	South Africa	To evaluate effect of COVID-19 in people living with HIV	Male, Female	cross-sectional study	131 HI infected and 20 HIV-uninfected	HIV1 controllers might increase implications for COVID-19 among people who are living with HIV	The study did not have data for BMI and glucose for the clients sampled
Phiri et al. (2021)	Spread of COVID-19 in Zambia: An assessment of environmental and socioeconomic factors	Zambia	To explore the association between COVID-19 and socioeconomic and	Male, Female	cross-sectional study	-	Geographical areas with high HIV rates had	The data on age groups and socioeconomic

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
	using a classification tree approach		also environmental issues				more chances of high cases of COVID-19	situation was not available
Chanda et al. (2021)	COVID-19 Severity and COVID-19–Associated Deaths Among Hospitalized Patients with HIV Infection — Zambia, March–December 2020	Zambia	To identify risk of COVID-19 intensity among people living with HIV	Male, Female	cross-sectional study	443	Being HIV infected did not predict hospitalisation	The limitation was data completeness of the secondary sources (clinic records)
Osibogun et al.(2021)	Outcomes of COVID-19 patients with comorbidities in southwest Nigeria	Nigeria	To identify comorbidities that increased severity of COVID-19	Male, Female	Retrospective analysis	2184 laboratory confirmed cases of COVID-19	Hypertension and HIV increased COVID-19 severity	Comorbidities were based on self-reported data
Grimsrud and Wilkinson (2021)	Acceleration of differentiated service delivery for HIV treatment in sub-Saharan Africa during COVID-19	SSA countries	The study sought to DSD models implemented in response to COVID-19 effects on HIV services	Male, Females	Retrospective analysis of publicly available data	-	Multi-month dispensing, community ART delivery were among the DSD models that assured continuity of ART	Data used was public available and likely to be incomplete

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
							services in the advent of COVID-19	
Zakumumpa et al. (2021)	Dispensing antiretroviral during COVID-19 lockdown: re-discovering community-based ART delivery models in Uganda	Eastern Uganda	The study sought explore strategies for ART provision during the COVID-19 pandemic	Health team leaders, ART clinic managers, representatives of PEPFAR implementing organisations, recipients of HIV care	qualitative case-study	99	Strategies included home-based delivery, multi-month dispensing and community distributions	Patients who participated may have been those who could overcome transport challenges
Nyoni (2020)	COVID-19-Compliant Strategies for Supporting Treatment Adherence Among People Living with HIV in Sub-Saharan Africa	Sub-Saharan Africa	To document COVID-19-Compliant Strategies for Promoting ART Adherence	Males, Females	Desk review	-	Using digital health interventions and treatment supporters was effective in support adherence to ART	The study is a desk review
Amimo (2020)	What does the COVID-19 pandemic mean for	Sub-Saharan Africa	To explore the potential effects of	Male, Female	Desk review	-	A call to protect the vulnerable key group of	The study is a desk review

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
	HIV, tuberculosis, and malaria control?		COVID-19 on HIV, TB and Malaria				the society as they are the hit the hardest	
Brault (2021)	Leveraging HIV Care Infrastructures for Integrated Chronic Disease and Pandemic Management in Sub-Saharan Africa	Sub-Saharan Africa	To proffer solution to the fight against COVID-19 learning from the HIV response	Male, Female	Desk review	-	A need to utilise HIV structures to respond to the COVID-19 pandemic	The study is a desk review
Bhaskaran, K. et al. (2021)	HIV infection and COVID-19 death: a population-based cohort analysis of UK primary care data and linked national death registrations within the OpenSAFELY platform'	United Kingdom	To examine COVID-19 deaths among people living with HIV	Male, Female (Adults)	Retrospective cohort study	17 282 905	People living with HIV had higher risk of COVID-19 death	Study used retrospective data only. The study was particularly crucial in showing the association of the risk in contracting COVID-19 when you are HIV positive. The study does not explore if COVID-19

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
								impacts the utilisation of HIV services
Kenmoe, S. et al. (2019)	Case fatality rate and viral aetiologies of acute respiratory tract infections in HIV-positive and negative people in Africa: The VARIAFRICA-HIV systematic review and meta-analysis'	Africa	To explore differences in COVID-19 fatalities between people living with HIV and those who are HIV negative	-	Systemic review and meta-analysis	-	An increased of COVID-19 fatality among people living with HIV	Study used retrospective data only. The study was particularly crucial in showing the association of the risk in contracting COVID-19 when you are HIV positive. The study does not explore if COVID-19 impacts the

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
								utilisation of HIV services
Tafuma, T. A. et al. (2018)	Barriers to HIV service utilisation by people living with HIV in two provinces of Zimbabwe: Results from 2016 baseline assessment'			People living with HIV	A qualitative descriptive study through 22 Focus group discussions	500	User fees, long waiting time, lack of male involvement were among the barrier noted to access of HIV treatment services	This study was done in the context of the pre-covid era, there now need to explore the new barriers brought in by COVID-19 such as covid lockdowns, covid related stigma among others. More so there is need to check if the barriers that existed before were further intensified by the coming in of COVID-19
Makurumidze, R. et al. (2020) ‘	Retention and predictors of attrition among patients who	Zimbabwe	To ascertain the factors of	People living with HIV	Retrospective cohort study	3,810	Being an adolescent, ART initiation date, WHO stage was	This study was done in the context of the pre-

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
	started antiretroviral therapy in Zimbabwe's national antiretroviral therapy programme between 2012 and 2015'		interruption of HIV treatment				important to determine the attrition from HIV care in Zimbabwe	covid era, there now need to explore the predictors in the advent of COVID-19
Mackworth-Young et al. (2021)	Community perspectives on the COVID-19 response, Zimbabwe	Zimbabwe	To reveal community perspectives on COVID-19 response	Males, Females	Rapid qualitative study	16	• Overload of information from sources that cannot be trusted • It was difficult for communities to comply with COVID-19 measure daily due to shortage of personal protective equipment	Further qualitative research is required with broader community stakeholders to provide more detailed understanding of community perceptions on the impact of COVID-19 which the study addressed with a particular focus to people living with HIV in Zimbabwe

Reference	Title	Study location	Aim of study	Socio demographic profile	Methodology	Sample size	Findings	Gaps
Murewanhema, G. et al. (2020)	A descriptive study of the trends of COVID-19 in Zimbabwe from March-June 2020: policy and strategy implications	Zimbabwe	To review the policy and strategy implications on COVID-19 and trends	-	Retrospective cohort study		High COVID-19 caseloads in urban areas compared to rural areas	The study was only a description of the COVID-19 trends
Murewanhema, G. and Makurumidze, R. (2020)	Essential health services delivery in Zimbabwe during the COVID-19 pandemic: perspectives and recommendations	Zimbabwe	To author perspective on essential services delivery during COVID-19	-	Perspective	-	- Delays in utilisation of health services, - Scarcity of protective equipment,	This study was a perspective
Meyer (2023)	Impact of the COVID-19 Pandemic on HIV Health care Service Engagement, Treatment Adherence, and Viral Suppression in the United States: A Systematic Literature Review	United States of America	To highlight how the COVID-19 pandemic impacted on retention services	-	Systemic review	-	In United States of America studies revealed negative impacts of the COVID-19 pandemic on HIV service provision	

Appendix A04: Questionnaire (English and Shona)



Demography and Population Studies
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Study Title: Intersecting Epidemics: The implications of COVID-19 in the utilisation of HIV treatment services among people living with HIV on antiretroviral treatment (ART) in Zimbabwe.

My name is Talent Tapera, and I am a PhD student in Demography and Population Studies at the University of the Witwatersrand, Johannesburg. As part of my studies, I am undertaking a research where I am investigating the implications of COVID-19 on utilisation of HIV treatment services in Zimbabwe. As part of this research, I would like to invite you to take part in an interview. This one-off interview will involve answering questions and will take around 15 minutes.

	General Info	
Q1	District name	
Q2	Residence	☐ 1. Rural ☐ 2. Urban
Q3	Type of health facility for accessing refill	☐ 1. Central hospital ☐ 2. Provincial health facility ☐ 3. District health facility ☐ 4. Primary health care facility ☐ 5. Mission hospital

I. Profile of participant

No.	Questions	Response categories
Q4	Age (years)	years
Q5	Gender	☐ 1. Male ☐ 2. Female

No.	Questions	Response categories
Q6	Marital status	☐ 1. Single ☐ 2. Married ☐ 3. Widowed
Q7	What is your religion	☐ 1. Traditional ☐ 2. Roman Catholic ☐ 3. Protestant ☐ 4. Pentecostal ☐ 5. Apostolic Sect ☐ 6. Other Christian ☐ 7. Muslim ☐ 8. None ☐ 9. Other..... (specify) ☐ 10. Do not know ☐ 11. Prefer not to answer
Q8	What is the highest level of school you attended	☐ 1. Primary ☐ 2. Secondary ☐ 3. Tertiary ☐ 4. Do not know ☐ 5. Did not attend school ☐ 6. Prefer not to answer

No.	Questions	Response categories

Utilisation of HIV treatment services

No.	Questions	Response categories
Q9	In past 24 months, did you manage to collect your ART drug refill on the set appointment? (If yes skip to Q11)	☐ 1. Yes ☐ 2. No
Q10	If no, what was the reason for not collecting or delaying collection of your ART drug refill (Multiple selection)	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility ☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers ☐ 8. Other.....(specify)
Q11	What challenges have you faced in accessing ART during the COVID-19 period	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility

No.	Questions	Response categories
	(Multiple selection)	☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers ☐ 8. Other.....(specify)
Q12	In past 24 months, did you manage to receive your viral load monitoring service as expected? (If yes skip to Q14)	☐ Yes ☐ No
Q13	If no, what was the reason for not receiving your viral load monitoring service as expected? (Multiple selection)	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility ☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers ☐ 8. Other.....(specify))
Q14	What challenges have you faced to receive your viral load monitoring service as expected? (Multiple selection)	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility ☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers ☐ 8. Other.....(specify)

No.	Questions	Response categories
Q15	In past 3 years, did you manage to receive your TB preventative therapy as expected? (If yes skip to Q17)	☐ 1. Yes ☐ 2. No
Q16	If no, what was the reason for not receiving your TB preventative therapy as expected? (Multiple selection)	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility ☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers ☐ 8. Other.....(specify)
Q17	What challenges have you faced to receive your TB preventative therapy as expected? (Multiple selection)	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility ☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers ☐ 8. Other.....(specify)
Q18	In past 24 months, did you manage to receive your TB screening as expected? (If yes skip to Q20)	☐ 1. Yes ☐ 2. No

No.	Questions	Response categories
Q19	If no, what was the reason for not receiving your TB screening as expected? (Multiple selection)	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility ☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers ☐ 8. Other.....(specify))
Q20	What challenges have you faced to receive your TB screening as expected? (Multiple selection)	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility ☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers ☐ 8. Other.....(specify)
Q21	In past 24 months, did you manage to receive cervical cancer screening? (For women on art only) (If yes skip to Q23)	☐ 1. Yes ☐ 2. No
Q22	If no, what was the reason for not receiving cervical cancer screening as expected? (Multiple selection)	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility ☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers

No.	Questions	Response categories
		☐ 8.Other.....(specify))
Q23	What challenges have you faced to receive your cervical cancer screening as expected? (Multiple selection)	☐ 1. COVID-19 lockdown restrictions ☐ 2. COVID-19 transport stoppages ☐ 3. Distance to health facility ☐ 4. Transport cost to health facility ☐ 5. Fear of contracting COVID-19 ☐ 6. Non-availability of community health care services ☐ 7. COVID-19 related stigma among Health care workers 8.Other.....(specify)

Need factors

No.	Questions	Response categories
Q24	In the past 24 months have you been Pregnant?	☐ 1. Yes ☐ 2. No
Q25	In the past 24 months have you had an opportunistic infection (TB, STI etc.) during COVID-19 period?	☐ 1. Yes ☐ 2. No
Q26	In the past 24 months have you had COVID-19 infection?	☐ 1. Yes ☐ 2. No

No.	Questions	Response categories
Q27	In the past 24 months have you been Contact of COVID-19 case?	☐ 1. Yes ☐ 2. No

COVID-19 Vaccination

No.	Questions	Response categories
Q28	Have you been vaccinated for COVID-19?	☐ 1. Yes ☐ 2. No
Q29	If no, any reason why (Multiple selection)	☐ 1. Religious reasons ☐ 2. Afraid of side effects ☐ 3. Distance to vaccination sites ☐ 4. Transport cost to vaccinated site ☐ 5. Not sure if people living with HIV should be vaccinated ☐ 7.Other..... (specify)
Q30	If the vaccine would be made available to you, would you be vaccinated?	☐ 1. Yes ☐ 2. No

Gwaro re Mibvunzo: SHONA



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Ongororo yebvunzurudzo pamusoro pekutora mishonga uye kurapwa kwe vanhu vari kurarama nehutachiwana hweHIV munguva ye hutachiwana hwe COVID-19.

Kwaziwai, Zita rangu ndinonzi Talent Tapera Ndiri kukukokai kupinda mutsvakiridzo maererano nekuwana rubatsiro uye kurapwa kwevanhu vari kurarama nehutachiwana hweHIV munguva yeCovid- 19 munyika yeZimbabwe. Ndiri kukukokai kuti mupinde muhurukuro iyi. Hurukuro iyi inosanganisira kupindura mibvunzo uye tinotasira kuti inotora maminitisi gumi nemashanu.

Zita remutsvakuridzi:

ID:

Zuva/Mwedzi/Gore: /...../.....

	Chikamu chekutanga	Mhinduro
Q1	Zita reDunhu	
Q2	Pekugara	☐ 1.Kumusha ☐ 2.Mudhorobha
Q3	Ndeipi nzvimbo yamunotorera mapiritsi enyu emaARV kana achinge aakupera?	☐ 1. Chipatara chikuru (central hospital) ☐ 2. Chipatara chikuru mu province (Provincial health facility) ☐ 3. Chipatara chemudunhu (District health facility) ☐ 4.Kiriniki ☐ 5.Chipatara che mishoni (Mission Hospital)

No.	Mibvunzo	Mhinduro
Q4	Une makore mangani akazara?	years
Q5	Uri munhurume kana munhukadzi?	☐ 1. Murume ☐ 2. Mukadzi

No.	Mibvunzo	Mhinduro
Q6	Wanano	☐ 1. Handina kuwana/kuwanikwa ☐ 2. Ndakaroora/kuroorwa ☐ 3. Ndakafirwa
Q7	Chitendero chenyu ndechipi	☐ 1.Zvechivanhu ☐ 2.Katurike (Roma) ☐ 3.Chechi dzakabvamuKaturike ☐ 4.Machechi ezvemweya ☐ 5.Chechi dzechipostori ☐ 6.Zvimwe zvitendero ☐ 7.MuMoslem ☐ 8.Hapana ☐ 9.Zvimwe..... (tsanangura) ☐ 10.Andizivi ☐ 11.Ndinosarudza kupindura mubvunzo uyu
Q8	Makadzidza kusvika padanho rechingani	☐ 1. Puraimari ☐ 2. Sekondari ☐ 3. College/Univhesiti ☐ 4. Handizivi ☐ 5.Handina kuenda kuchikoro ☐ 6. Ndinosarudza kupindura mbvunzo uyu

No.	Mibvunzo	Mhinduro
Q9	Mwedzi gumi nemiviri yapfuura makakwanisa kunotora mushonga wenyu we maARV zuva ramaifanira kunotora here?	☐ 1.Hongu ☐ 2.Kwete
Q10	Kana mati kwete ndezvipi zvikonzero zvakakutadzisai kana zvakakunonotsayi kuno tora mishonga yenyu yemaARVS?	☐ 1. Mitemo yekuderedza kutapuriranwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19 ☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara) ☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki? ☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19 ☐ 6. Kushayikwa kwe vanorapa munharaunda ☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19. ☐ 8.Zvimwe.....(tsanangu ra)
Q11	Ndeapi matambudziko amakasangana nawo pakutora mishonga yenyu yemaARVs munguva yeCOVID-19?	☐ 1. Mitemo yekuderedza kutapuriranwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19 ☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara) ☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki? ☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19 ☐ 6. Kushayikwa kwe vanorapa munharaunda

No.	Mibvunzo	Mhinduro
		☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19. 8.Zvimwe.....(tsanangura)
Q12	Mumwedzi gumi nemiviri yapfuura makakwanisa kuwana mukana weku no ongororwa huhwando hweutachiwana mumuviri sezvinotarisiwa here?	☐ 1.Hongu ☐ 2.Kwete
Q13	Kana mati kwete ndezvipi zvikonzero zvakakutadzisai kunoongororwa huhwando hweutachiwana mumuviri sezvinotarisiwa?	☐ 1. Mitemo yekuderedza kutapurirwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19 ☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara) ☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki? ☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19 ☐ 6. Kushayikwa kwe vanorapa munharaunda ☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19. ☐ 8.Zvimwe.....(tsanangura)
Q14	Ndeapi mamwe matambudziko ama kasangana nawo kana amuri kusangana nawo pa kunotarisiwa huhwando hweutachiwana mumuviri sezvinotarisiwa?	☐ 1. Mitemo yekuderedza kutapurirwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19 ☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara) ☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki? ☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19

No.	Mibvunzo	Mhinduro
		☐ 6. Kushayikwa kwe vanorapa munharaunda ☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19. ☐ 8.Zvimwe.....(tsanangu ra)
Q15	Mumakore matatu apfuura makakwanisa kuno piwa mapiritsi ekudzivirira chirwere cherurindi sezvinotarisirwa here?	☐ 1.Hongu ☐ 2.Kwete
Q16	Kana mati kwete ndezvipi zvikonzero zvakaita kuti musapiwa mapiritsi ekudzivirira chirwere cherurindi sezvinotarisirwa?	☐ 1. Mitemo yekuderedza kutapuriranwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19 ☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara) ☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki? ☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19 ☐ 6. Kushayikwa kwe vanorapa munharaunda ☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19. ☐ 8.Zvimwe.....(tsanangu ra)
Q17	Ndeapi mamwe matambudziko amakasangana nawo pakuwana kana pakutora mapiritsi ekudzivirira chirwere cherurindi munguva yeCOVID-19?	☐ 1. Mitemo yekuderedza kutapuriranwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19 ☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara) ☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki?

No.	Mibvunzo	Mhinduro
		☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19 ☐ 6. Kushayikwa kwe vanorapa munharaunda ☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19. ☐ 8.Zvimwe.....(tsanangu ra)
Q18	Mwedzi gumi nemiviri yadarika makakwanisa kuongororwa chirwere cherurindi sezvinotarisirwa here?	☐ 1.Hongu ☐ 2.Kwete
Q19	Kana mati kwete ndezvipi zvikonzero zvakaita kuti musanoongororwa chirwere cherurindi sezvinotarisirwa?	☐ 1. Mitemo yekuderedza kutapuriranwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19 ☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara) ☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki? ☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19 ☐ 6. Kushayikwa kwe vanorapa munharaunda ☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19. ☐ 8.Zvimwe.....(tsanangu ra)
Q20	What are the challenges you have faced in receiveing your TB screening as expected? Ndeapi matambudziko amakasangana nawo arikukutadzisai kunoongororwa chirwere cherurindi munguva yeCOVID-19?	☐ 1. Mitemo yekuderedza kutapuriranwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19 ☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara)

No.	Mibvunzo	Mhinduro
		☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki? ☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19 ☐ 6. Kushayikwa kwe vanorapa munharaunda ☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19. ☐ 8.Zvimwe.....(tsanangu ra)
Q21	Mumwedzi gumi nemiviri yadarika makakwanisa kuno ongororwa gomarara remuromo wechibereko? (Vakadzi chete)	☐ 1.Hongu ☐ 2.Kwete
Q22	Kana mati kwete ndezvipi zvikonzero zvakaita kuti musanoongororwa gomarara wemuromo wechibereko sezvinotarisisirwa?	☐ 1. Mitemo yekuderedza kutapuriranwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19 ☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara) ☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki? ☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19 ☐ 6. Kushayikwa kwe vanorapa munharaunda ☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19. ☐ 8.Zvimwe.....(tsanangu ra)
Q23	Ndeapi mamwe matambudziko amakasangana nawo akakutadzisai kunoongororwa gomarara remuromo wechibereko sezvinotarisisirwa?	☐ 1. Mitemo yekuderedza kutapuriranwa kwe utachiwana hweCOVID-19 ☐ 2. Kumiswa kufamba kwemichovha pamigwagwa munguva yeCOVID-19

No.	Mibvunzo	Mhinduro
		☐ 3. Chinhambwe chekuenda kunoitwa nezveutano (kiriniki kana chipatara) ☐ 4. Mari yekufambisa kuenda kuchipatara kana kukiriniki? ☐ 5. Kutya kutapurirwa utachiwana hweCOVID-19 ☐ 6. Kushayikwa kwe vanorapa munharaunda ☐ 7. Rusarura kubva kuvashandi vezvehutano munguva yeCOVID-19 ☐ 8.Zvimwe..... (tsanangura)

No.	Mibvunzo	Mhinduro
Q24	Mumakore maviri adarika maive nepamuviri here?	☐ 1.Hongu ☐ 2.Kwete
Q25	Mumakore maviri adarika makamborwara nezvirwere zvinotora mukawana wechimwe chirwere zvakaita se (TB,STI,etc) munguva yeCovid -19?	☐ 1.Hongu ☐ 2.Kwete
Q26	Mumakore maviri adarika makabatwa kunzi mune hutachiwana hweCOVID-19 here?	☐ 1.Hongu

No.	Mibvunzo	Mhinduro
		☐ 2.Kwete
Q27	Mumakore maviri adarika mungava makava pedyo nemunhu aive neutachiwana hwe COVID-19?	☐ 1.Hongu ☐ 2.Kwete

No.	Mibvunzo	Mhinduro
Q28	Makabaiwa nhomba ye COVID-19 here?	☐ 1.Hongu ☐ 2.Kwete
Q29	If no, any reason why Kana musina kubayiwa nhomba makaregererei?	☐ 1.Zvikonzero zvine chekuita mechitendero ☐ 2. Ndinoty kusangana nematambudziko anogona kukonzereswa nekubayiwa mushonga wacho ☐ 3. Kurikubayiwa nhomba kure ☐ 4. Mari yekufambisa kuenda kunobayiwa ☐ 5. Andina chokwadi chekuti vanhu vane hutachiwana hweHIV vanofanira kubayiwa nhomba? ☐ 6. Mushonga wekubayiwa nhomba hakuna ☐ 7.Zvimwe..... (tsanangura)

No.	Mibvunzo	Mhinduro
Q30	Kana mushonga wekubayiwa nhomba ukawanika mungade here kubayiwa nhomba yeCOVID-19?	☐ 1.Hongu ☐ 2.Kwete



Appendix A05: In-Depth Interview Guide for Community Volunteers (English and Shona)



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• <http://web.wits.ac.za/Academic/humanities/socialsciences/demographyandpopulationstudies>

Study Title: Intersecting Epidemics: The implications of COVID-19 in the utilisation of HIV treatment services among people living with HIV on antiretroviral treatment (ART) in Zimbabwe.

Principal Investigator: Talent Tapera

A. Interviewers Instruction

The first broad question in each section is your introduction that you want your informant to provide information on. You must allow a few seconds for your informant to think before responding to the question. Never introduce your probes without first, giving your informant the chance to provide information on the broad question. Also, take each probe one at a time. If the informant mentioned something related to one of your probes while answering the broad question, follow on that with the appropriate probe irrespective of whether the probe is the first or last. This interview must be conducted in conversational format (not question and answer session) and the probes should be introduced in a way that they ensure a continued flow of information between you and the informant (3 minutes).

B. Purpose of the interview

During this interview, we would like to have your honest opinions on a range of issues that affect utilization of HIV treatment testing services during the COVID-19 period based on your own

experience and your opinions. The information you provide will be strictly confidential and will be used for research purposes only and will not be linked to you in any way. Do I have your permission to proceed with the interview (3 minutes)?

- How has COVID-19 impacted your utilization of HIV treatment services (probe for Art refill, viral load monitoring, TB screening)
- What factors have influenced your continued utilization of HIV services since the outbreak of COVID-19 (probe for enabling, need, predisposing and environmental factors)
- Based on your work in HIV in your district do people living with HIV have any reservations in accessing the COVID-19 vaccine. (If so probe for the reasons behind)
- What would you recommend as ways to ensure people living with HIV do not discontinue accessing services during the COVID-19 pandemic?

Gwaro rehurukuro ne vashandi vakazvipira vemuNharaunda (Shona)



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Ongororo yebvunzurudzo pamusoro pekutora mishonga uye kurapwa kwe vanhu vari kurarama nehutachiwana hweHIV munguva yehutachiwana hwe COVID-19.

Principal Investigator: Talent Tapera

A. Zvinotarisirwa pakuhurukuro

Mibvunzo yekutanga muchikamu choga choga ndeye nhanganyaya yauri kuda kuwana ruzivo kumupinduri. Munofanira kutendera nguva yekuti muongororwi afunge asati apindura mubvunzo. Musatanga maudza muongororwi zvimwe zvinogona kudiwa semhinduro itai kuti atange ambotipa pfungwa kana maonero ake torai nguva yenyu. Kana muongororwi akapa mhinduro itai kuti mubvunze zvichienderana nemhinduro dzake zvisinei nekuti mibvunzo iyi inenge iri papepa. Hurukuro iyi inotarisirwa kuitwa vanhu vachiita sevari kutaurirana uye vachipanana mhinduro maererano nezvamunenge mavabvunza. Mibvunzo inofanira kubvunzwa nenzira inoita kuti hurukuro irambe ichienderera mberi pakati memuongorori nemuongororwi.

B. Donzvo re hurukuro

Panguva yehurukuro tiri kuda kunzwa zvakajeka pamusoro pemaonero enyu maererano nekuwana rubatsiro kwevanhu vari kurarama vaine hutachiwana hwe HIV munguva yeCOVID-19. Tinotarisira kuwana mhinduro dzenyu maererano nezvamacasanganana nazvo uye maonero enyu panguva yamaitsvaga rubatsiro panguva iyi. Hurukuro iyi neruzivo rwamuchatipa hwuchachengetedzwa zvakavandika uye huchashandiswa mutsvakiridzo ino chete. Hapana mashoko anodoma mazita enyu achatorwa kubva kwamuri. Muri kunditendera kuti ndienderere mberi nehurukuro here?

- Chirwere che Covid -19 chine zva chakakachinja here maererano nemawaniro amanga muchiita rubatsiro uye kurapwa hutachiwana hwe HIV takanangana ne (kutora mapiritsi emaARV, kuongororwa kuwanda kwehutachiwana mumuviri, kutariswa chirwere cherurindi (TB).
- Ndezvipi zvinhu zvaita kuti munzwe kuda kuenderera mberi kuwana rubatsiro rwekurapwa hutachiwana hwe HIV zvichitevera kunyuka nekupararira kwechirwere cheCovid -19 (bvunza pamusoro pe zvinogonesa, zvinosunda, zvakatipoteredza).
- Tichitarisa kushanda kwenyu mudunhu renyu vanhu vane hutachiwana hweHIV vangaita zvikonzero maererano nekunobaiwa nhomba ye COVID-19 (bvunza pamusoro pe zvikonzero).
- Ndezvipi zvamungakurudzira kuti vanhu varikurarama nehutachiwana hweHIV munguva yeCOVID-19 vaite, kuti varambe vachiwana rubatsiro hwekurapwa kana kutora mishonga yavo?

Appendix A06: Key informant Interview Guide for HIV Focal Persons and Health Promotion Officers (English and Shona)



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• <http://web.wits.ac.za/Academic/humanities/socialsciences/demographyandpopulationstudies>

Study Title: Intersecting Epidemics: The implications of COVID-19 in the utilisation of HIV treatment services among people living with HIV on antiretroviral treatment (ART) in Zimbabwe.

Principal Investigator: Talent Tapera

A. Interviewers Instruction

The first broad question in each section is your introduction that you want your informant to provide information on. You must allow a few seconds for your informant to think before responding to the question. Never introduce your probes without first, giving your informant the chance to provide information on the broad question. Also, take each probe one at a time. If the informant mentioned something related to one of your probes while answering the broad question, follow on that with the appropriate probe irrespective of whether the probe is the first or last. This interview must be conducted in conversational format (not question and answer session) and the probes should be introduced in a way that they ensure a continued flow of information between you and the informant (3 minutes).

B. Purpose of the interview

During this interview, we would like to have your honest opinions on a range of issues that affect utilization of HIV treatment testing services during the COVID-19 period based on your own experience and your opinions. The information you provide will be strictly confidential and will be used for research purposes only and will not be linked to you in any way. Do I have your permission to proceed with the interview (3 minutes)?

- How has COVID-19 impacted your utilization of HIV treatment services (probe for Art refill, viral load monitoring, TB screening)
- What factors have influenced your continued utilization of HIV services since the outbreak of COVID-19 (probe for enabling, need, predisposing and environmental factors)
- Based on your work in HIV in your district do people living with HIV have any reservations in accessing the COVID-19 vaccine. (If so probe for the reasons behind)
- What would you recommend as ways to ensure people living with HIV do not discontinue accessing services during the COVID-19 pandemic?

Gwaro rehurukuro revanoona nezve hutachiwana muDunhu (Shona)



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Ongororo yebvunzurudzo pamusoro pekutora mishonga uye kurapwa kwe vanhu vari kurarama nehutachiwana hweHIV munguva ye hutachiwana hwe COVID-19.

Principal Investigator: Talent Tapera

A. Zvinotarisirwa pakuhurukuro

Mibvunzo yekutanga muchikamu choga ndeye nhanganyaya yauri kuda kuwana ruzivo kumupinduri. Munofanira kutendera nguva yekuti muongororwi afunge asati apindura mubvunzo. Musatanga maudza muongororwi zvimwe zvinogona kudiwa semhinduro itai kuti atange ambotipa pfungwa kana maonero ake torai nguva yenyu. Kana muongororwi akapa mhinduro itai kuti mubvunze zvichienderana nemhinduro dzake zvisinei nekuti mibvunzo iyi inenge iri papepa. Hurukuro iyi inotarisirwa kuitwa vanhu vachiita sevari kutaurirana uye vachipanana mhinduro maererano nezvamunenge mavabvunza. Mibvunzo inofanira kubvunzwa nenzira inoita kuti hurukuro irambe ichienderera mberi pakati memuongorori nemuongororwi.

B. Donzvo re hurukuro

Panguva yehurukuro tiri kuda kunzwa zvakajeka pamusoro pemaonero enyu maererano nekuwana rubatsiro kwevanhu vari kurarama vaine hutachiwana hwe HIV munguva yeCOVID-19. Tinotarisirwa kuwana mhinduro dzenyu maererano nezvamakasangana nazvo uye maonero enyu panguva yamaitsvaga rubatsiro panguva iyi. Hurukuro iyi neruzivo rwamuchatipa hwuchachengetedzwa zvakavandika uye huchashandiswa mutsvakiridzo ino chete. Hapana mashoko anodoma mazita enyu achatorwa kubva kwamuri. Muri kunditendera kuti ndienderere mberi nehurukuro here?

- Chirwere che COVID-19 chine zva chakakachinja here maererano nemawaniro amanga muchiita rubatsiro uye kurapwa hutachiwana hwe HIV takanangana ne (kutora mapiritsi emaARV, kuongororwa kuwanda kwehutachiwana mumuviri, kutariswa chirwere cherurindi (TB).
- Ndezvipi zvinhu zvaita kuti munzwe kuda kuenderera mberi kuwana rubatsiro rwekurapwa hutachiwana hwe HIV zvichitevera kunyuka nekupararira kwechirwere cheCovid -19 (bvunza pamusoro pe zvinogonesa, zvinosunda, zvakatipoterredza).
- Tichitarisa kushanda kwenyu mudunhu renyu vanhu vane hutachiwana hweHIV vangaita zvikonzero maererano nekunobaiwa nhomba ye COVID-19 (bvunza pamusoro pe zvikonzero).
- Ndezvipi zvamungakurudzira kuti vanhu varikurarama nehutachiwana hweHIV munguva yeCOVID-19 vaite, kuti varambe vachiwana rubatsiro hwekurapwa kana kutora mishonga yavo?

Appendix A07: Ethics approval - Medical Research Council of Zimbabwe

Telephone: 08644072773/791193
E-mail: mrcz@mrcz.org.zw
Website: <http://www.mrcz.org.zw>



Medical Research Council of Zimbabwe
20 Cambridge Road
Avondale
Harare
Zimbabwe

APPROVAL

MRCZ/A/2868

4 April, 2022

Talent Tapera
5677 Fidelity
South view Park
Harare

RE: - Intersecting Epidemics: The Implications of COVID-19 in the Utilisation of HIV treatment services among people living with HIV on antiretroviral treatment (ART) in Zimbabwe

Thank you for the application for review of research activity that you submitted to the Medical Research Council of Zimbabwe (MRCZ). Please be advised that the Medical Research Council of Zimbabwe has **reviewed** and **approved** your application to conduct the above titled study.

This approval is based on the review and approval of the following documents that were submitted to MRCZ for review:

1. Protocol version 1.0 dated March 30, 2022
2. Informed consent forms Version 2.0 dated March 30, 2022
3. Data collection tools

• **APPROVAL NUMBER** : MRCZ/A/2868

This number should be used on all correspondence, consent forms and documents as appropriate.

• **TYPE OF MEETING** : Full Board

• **MEETING DATE** : March 31, 2022

• **APPROVAL DATE** : April 1, 2022

• **EXPIRATION DATE** : March 31, 2023

After this date, this project may only commence upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the MRCZ Offices should be submitted three months before the expiration date for continuing review.

• **SERIOUS ADVERSE EVENT REPORTING:** All serious problems having to do with subject safety must be reported to the Institutional Ethical Review Committee (IERC) as well as the MRCZ within 3 working days using standard forms obtainable from the MRCZ Offices or website.

• **MODIFICATIONS:** Prior MRCZ and IERC approval using standard forms obtainable from the MRCZ Offices is required before implementing any changes in the Protocol (including changes in the consent documents).

• **TERMINATION OF STUDY:** On termination of a study, a report has to be submitted to the MRCZ using standard forms obtainable from the MRCZ Offices or website.

• **QUESTIONS:** Please contact the MRCZ on Telephone No. (0242) 791193/08644073772 or by e-mail on mrcz@mrcz.org.zw

Other

- Please be reminded to send in copies of your research results for our records as well as for Health Research Database.
- You're also encouraged to submit electronic copies of your publications in peer-reviewed journals that may emanate from this study.
- **In addition to this approval, all clinical trials involving drugs, devices and biologics (including other studies focusing on registered drugs) require approval of Medicines Control Authority of Zimbabwe (MCAZ) before commencement.**

Yours Faithfully

MRCZ SECRETARIAT
FOR CHAIRPERSON
MEDICAL RESEARCH COUNCIL OF ZIMBABWE



PROMOTING THE ETHICAL CONDUCT OF HEALTH RESEARCH

Appendix A08: Ethics Clearance - University of Witwatersrand Human Research Council (Medical)



R49 Mr T Tapera

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL) CLEARANCE CERTIFICATE NO. M220425

NAME:
(Principal Investigator)

Mr T Tapera

DEPARTMENT:

School of Social Sciences
Demography and Population Studies Unit
University

PROJECT TITLE:

Intersecting Epidemics: The implications of COVID-19 in the utilization of HIV treatment services among people living with HIV on antiretroviral treatment (ART) in Zimbabwe

DATE CONSIDERED:

2022/04/29

DECISION:

Approved unconditionally

CONDITIONS:

NOTE:

If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>

SUPERVISOR:

Professor C Odimegwu and Dr P Chimberengwa

APPROVED BY:


Dr CB Penny, Chairperson, HREC (Medical)

DATE OF APPROVAL:

2022/08/12

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report.** When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **April** and therefore reports and re-certification will be due in the month of **April** each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator

Date

Appendix A09: Stata Analysis Do File

*DATA ANALYSIS COMBINED FILE

//OPENING DATASET

use PhdDataset_combined, clear

//TABLE: BACKGROUND CHARACTERSTICS

tabulate Q4agegroup4

tabulate Q5_gender

tabulate Q6_marital_status

tabulate Q2_residence

tabulate religion2

tabulate Q8_education

tabulate Q3_facility

tabulate Q28_Covid_19covid_vaccinated

/////// OUTCOMES

ta Q9_ART_OI_servicesappointment

```
ta Q12_ART_OI_servicesviral_load
```

```
ta Q15_ART_OI_servicestpt_services
```

```
ta Q18_ART_OI_servicestb_screening
```

```
recode Q9_ART_OI_servicesappointment (1=1 yes) (2=0 no), gen(ART_drug_refill)
```

```
ta ART_drug_refill
```

```
recode Q12_ART_OI_servicesviral_load (1=1 yes) (2=0 no), gen(viral_load)
```

```
recode Q15_ART_OI_servicestpt_services (1=1 yes) (2=0 no), gen(TB_Prev_therapy)
```

```
recode Q18_ART_OI_servicestb_screening (1=1 yes) (2=0 no), gen(TB_screening)
```

```
*****
```

```
//Table UTILISATION
```

```
tabulate Q4agegroup4 ART_drug_refill, row chi2
```

```
tabulate Q4agegroup4 viral_load, row chi2
```

```
tabulate Q4agegroup4 TB_Prev_therapy, row chi2
```

```
tabulate Q4agegroup4 TB_screening, row chi2
```

```
tabulate Q5_gender ART_drug_refill, row chi2
```

```
tabulate Q5_gender viral_load, row chi2
```

```
tabulate Q5_gender TB_Prev_therapy, row chi2
```

```
tabulate Q5_gender TB_screening, row chi2
```

```
tabulate Q6_marital_status ART_drug_refill, row chi2
```


tabulate Q6_marital_status viral_load, row chi2
 tabulate Q6_marital_status TB_Prev_therapy, row chi2
 tabulate Q6_marital_status TB_screening, row chi2
 tabulate religion2 ART_drug_refill, row chi2
 tabulate religion2 viral_load, row chi2
 tabulate religion2 TB_Prev_therapy, row chi2
 tabulate religion2 TB_screening, row chi2
 tabulate Q8_education ART_drug_refill, row chi2
 tabulate Q8_education viral_load, row chi2
 tabulate Q8_education TB_Prev_therapy, row chi2
 tabulate Q8_education TB_screening, row chi2
 tabulate Q28_Covid_19covid_vaccinated ART_drug_refill, row chi2
 tabulate Q28_Covid_19covid_vaccinated viral_load, row chi2
 tabulate Q28_Covid_19covid_vaccinated TB_Prev_therapy, row chi2
 tabulate Q28_Covid_19covid_vaccinated TB_screening, row chi2
 tabulate Q24_factorspregnant ART_drug_refill, row chi2
 tabulate Q24_factorspregnant viral_load, row chi2
 tabulate Q24_factorspregnant TB_Prev_therapy, row chi2
 tabulate Q24_factorspregnant TB_screening, row chi2

tabulate Q25_factorsoi ART_drug_refill, row chi2

tabulate Q25_factorsoi viral_load, row chi2

tabulate Q25_factorsoi TB_Prev_therapy, row chi2

tabulate Q25_factorsoi TB_screening, row chi2

tabulate Q26_factorsc19 ART_drug_refill, row chi2

tabulate Q26_factorsc19 viral_load, row chi2

tabulate Q26_factorsc19 TB_Prev_therapy, row chi2

tabulate Q26_factorsc19 TB_screening, row chi2

tabulate Q27_factorsc19_contact ART_drug_refill, row chi2

tabulate Q27_factorsc19_contact viral_load, row chi2

tabulate Q27_factorsc19_contact TB_Prev_therapy, row chi2

tabulate Q27_factorsc19_contact TB_screening, row chi2

tabulate Q2_residence ART_drug_refill, row chi2

tabulate Q2_residence viral_load, row chi2

tabulate Q2_residence TB_Prev_therapy, row chi2

tabulate Q2_residence TB_screening, row chi2

tabulate Q3_facility ART_drug_refill, row chi2

tabulate Q3_facility viral_load, row chi2

tabulate Q3_facility TB_Prev_therapy, row chi2

tabulate Q3_facility TB_screening, row chi2

//REASONS FOR NOT UTILISING

tabulate Q10_ART_OI_servicesdelaying_col

tabulate Q13_ART_OI_servicesreason_vl

tabulate Q16_ART_OI_servicesreason_tpt

tabulate Q19_ART_OI_servicesreason_tb

// CROSSTABULATION OF SEX AND UTILISATION BY AGE CATEGORY

tabulate Q5_gender Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q6_marital_status Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate religion2 Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q8_education Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q28_Covid_19covid_vaccinated Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q24_factorspregnant Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q25_factorsoi Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q26_factorsc19 Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q27_factorsc19_contact Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q2_residence Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q3_facility Q4agegroup3 if ART_drug_refill==1, col chi2

tabulate Q5_gender Q4agegroup3 if viral_load==1, col chi2
 tabulate Q6_marital_status Q4agegroup3 if viral_load==1, col chi2
 tabulate religion2 Q4agegroup3 if viral_load==1, col chi2
 tabulate Q8_education Q4agegroup3 if viral_load==1, col chi2
 tabulate Q28_Covid_19covid_vaccinated Q4agegroup3 if viral_load==1, col chi2
 tabulate Q24_factorspregnant Q4agegroup3 if viral_load==1, col chi2
 tabulate Q25_factorsoi Q4agegroup3 if viral_load==1, col chi2
 tabulate Q26_factorsc19 Q4agegroup3 if viral_load==1, col chi2
 tabulate Q27_factorsc19_contact Q4agegroup3 if viral_load==1, col chi2
 tabulate Q2_residence Q4agegroup3 if viral_load==1, col chi2
 tabulate Q3_facility Q4agegroup3 if viral_load==1, col chi2
 tabulate Q5_gender Q4agegroup3 if TB_Prev_therapy==1, col chi2
 tabulate Q6_marital_status Q4agegroup3 if TB_Prev_therapy==1, col chi2
 tabulate religion2 Q4agegroup3 if TB_Prev_therapy==1, col chi2
 tabulate Q8_education Q4agegroup3 if TB_Prev_therapy==1, col chi2
 tabulate Q28_Covid_19covid_vaccinated Q4agegroup3 if TB_Prev_therapy==1, col chi2
 tabulate Q24_factorspregnant Q4agegroup3 if TB_Prev_therapy==1, col chi2
 tabulate Q25_factorsoi Q4agegroup3 if TB_Prev_therapy==1, col chi2
 tabulate Q26_factorsc19 Q4agegroup3 if TB_Prev_therapy==1, col chi2

tabulate Q27_factorsc19_contact Q4agegroup3 if TB_Prev_therapy==1, col chi2

tabulate Q2_residence Q4agegroup3 if TB_Prev_therapy==1, col chi2

tabulate Q3_facility Q4agegroup3 if TB_Prev_therapy==1, col chi2

tabulate Q5_gender Q4agegroup3 if TB_screening==1, col chi2

tabulate Q6_marital_status Q4agegroup3 if TB_screening==1, col chi2

tabulate religion2 Q4agegroup3 if TB_screening==1, col chi2

tabulate Q8_education Q4agegroup3 if TB_screening==1, col chi2

tabulate Q28_Covid_19covid_vaccinated Q4agegroup3 if TB_screening==1, col chi2

tabulate Q24_factorspregnant Q4agegroup3 if TB_screening==1, col chi2

tabulate Q25_factorsoi Q4agegroup3 if TB_screening==1, col chi2

tabulate Q26_factorsc19 Q4agegroup3 if TB_screening==1, col chi2

tabulate Q27_factorsc19_contact Q4agegroup3 if TB_screening==1, col chi2

tabulate Q2_residence Q4agegroup3 if TB_screening==1, col chi2

tabulate Q3_facility Q4agegroup3 if TB_screening==1, col chi2

//MULTIVARIATE LOGISTIC REGRESSION OF UTIISATION

logistic ART_drug_refill ib2.Q2_residence ib2.Q3_facility ib2.Q4agegroup4 ib2.Q5_gender
ib2.Q6_marital_status ib2.religion2 ib2.Q8_education ib2.Q11_ART_OI_servicesart_challeng
ib2.Q25_factorsoi ib2.Q26_factorsc19 ib2.Q27_factorsc19_contact
ib2.Q28_Covid_19covid_vaccinated

logistic viral_load ib2.Q2_residence ib2.Q3_facility ib2.Q4agegroup4 ib2.Q5_gender
ib2.Q6_marital_status ib2.religion2 ib2.Q8_education ib2.Q14_ART_OI_servicesvl_challenge

ib2.Q25_factorsoi ib2.Q26_factorsc19 ib2.Q27_factorsc19_contact
 ib2.Q28_Covid_19covid_vaccinated

logistic TB_Prev_therapy ib2.Q2_residence ib2.Q3_facility ib2.Q4agegroup4 ib2.Q5_gender
 ib2.Q6_marital_status ib2.religion2 ib2.Q8_education ib2.Q17_ART_OI_servicestpt_challeng
 ib2.Q25_factorsoi ib2.Q26_factorsc19 ib2.Q27_factorsc19_contact
 ib2.Q28_Covid_19covid_vaccinated

logistic TB_screening ib2.Q2_residence ib2.Q3_facility ib2.Q4agegroup4 ib2.Q5_gender
 ib2.Q6_marital_status ib2.religion2 ib2.Q8_education ib2.Q20_ART_OI_servicestb_challenge
 ib2.Q25_factorsoi ib2.Q26_factorsc19 ib2.Q27_factorsc19_contact
 ib2.Q28_Covid_19covid_vaccinated

//COVID-19 vaccine utilisation Table

tabulate Q4agegroup4 Q28_Covid_19covid_vaccinated, row chi2

tabulate Q5_gender Q28_Covid_19covid_vaccinated, row chi2

tabulate Q6_marital_status Q28_Covid_19covid_vaccinated, col chi2

tabulate religion2 Q28_Covid_19covid_vaccinated, row chi2

tabulate Q8_education Q28_Covid_19covid_vaccinated, row chi2

tabulate Q24_factorspregnant Q28_Covid_19covid_vaccinated, row chi2

tabulate Q25_factorsoi Q28_Covid_19covid_vaccinated, row chi2

tabulate Q26_factorsc19 Q28_Covid_19covid_vaccinated, row chi2

tabulate Q27_factorsc19_contact Q28_Covid_19covid_vaccinated, row chi2

tabulate Q3_facility Q28_Covid_19covid_vaccinated, row chi2

tabulate Q2_residence Q28_Covid_19covid_vaccinated, row chi2

```
//reasons for vaccine utilisation Table
```

```
tabulate Q29_Covid_19no_vaccinationreas
```

```
//Multivariate logistic regression Analysis Table vaccination (utilisation)
```

```
//////// Vaccination OUTCOMES
```

```
ta Q28_Covid_19covid_vaccinated
```

```
recode Q28_Covid_19covid_vaccinated (1=1 yes) (2=0 no), gen(Vaccination)
```

```
ta Vaccination
```

```
//CROSSTABULATION OF SEX AND VACCINATION BY AGE CATEGORY
```

```
tabulate Q5_gender Q4agegroup3 if Vaccination==1, col chi2
```

```
tabulate Q6_marital_status Q4agegroup3 if Vaccination==1, col chi2
```

```
tabulate religion2 Q4agegroup3 if Vaccination==1, col chi2
```

```
tabulate Q8_education Q4agegroup3 if Vaccination==1, col chi2
```

```
tabulate Q24_factorspregnant Q4agegroup3 if Vaccination==1, col chi2
```

```
tabulate Q25_factorsoi Q4agegroup3 if Vaccination==1, col chi2
```

```
tabulate Q26_factorsc19 Q4agegroup3 if Vaccination==1, col chi2
```

```
tabulate Q27_factorsc19_contact Q4agegroup3 if Vaccination==1, col chi2
```

```
tabulate Q3_facility Q4agegroup3 if Vaccination==1, col chi2
```

```
tabulate Q2_residence Q4agegroup3 if Vaccination==1, col chi2
```

```
*MULTIVARIATE LOGISTIC REGRESSION OF COVID-19 VACCINATION
```

logistic Vaccination ib2.Q2_residence ib2.Q3_facility ib2.Q4agegroup4 ib2.Q5_gender
ib2.Q6_marital_status ib2.religion2 ib2.Q8_education ib2.Q25_factorsoi ib2.Q26_factorsc19
ib2.Q27_factorsc19_contact

Appendix A10: Editor's Letter

Nikki Watkins

Editing/proofreading services

Cell: 072 060 2354

E-mail: nikki.watkins.pe@gmail.com

13 June 2023

To whom it may concern

This letter confirms that I have done language editing and proofreading of the PhD thesis:

Intersecting Epidemics: The implications of COVID-19 in the utilisation of HIV treatment services among people living with HIV on antiretroviral treatment (ART) in Zimbabwe

by

Talent Tapera



Nikki Watkins
Associate Member

Membership number: WAT003
Membership year: March 2023 to February 2024

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www.editors.org.za

UK Centre of Excellence Editing and Proofreading Diploma
SA Writers College Certificate of Copy-Editing and Proofreading

All changes were indicated by Track Changes (MS Word) for the author to verify. As the editor I am not responsible for any changes not implemented, any plagiarism or unverified facts. The final document remains the responsibility of the author.

