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DETERMINANTS OF VIRAL LOAD UN-SUPPRESSION AMONG ADOLESCENTS LIVING WITH HIV IN CARE, WESTERN DISTRICT, HARARE CITY, 2023

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH IN THE COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

2024

Abstract

According to World Health Organization (WHO, 2016), recommended viral load is the measure of viral treatment adherence and efficacy. A stable patient on ART whose viral load is suppressed is defined as having success to treatment noted by a threshold of VL<50 copies/ml and has been on treatment for at least 6 months, having no current opportunistic infections, and should have a good understanding of life long adherence (MOHCC, 2016). Measures of the virology outcomes are very essential as adolescents have unique behaviors, which may lead to poor adherence to ART, hence leading to drug resistance, viral load un-suppression and ultimately morbidity and mortality. In Harare Western district viral load un-suppression increased from 13.2% to 22.3% and it is against this background that we identified the determinants of viral load un-suppression which include socio-demographic, client, ART regimen, related factors and HIV/AIDS knowledge levels among adolescents living with HIV in care, assessing the availability of anti-retroviral medicines, and viral load monitoring services for adolescents living with HIV in care in this district. A 1:1 unmatched case-control study was conducted and the source population of this study came from all adolescents aged between 10-19 years and had been receiving HIV treatment care at Harare Western District clinics for at least 6 months. Participants were identified from records at the study sites and systematic sampling was done to obtain 78 controls and 78cases. Data was collected using an interviewer administered structured questionnaire and a key informant interview guide and the following results were obtained. Most of the cases 45/78 (57.7%), and controls 42/78 (53.9%) were female. The median age for cases and controls in years was 14.9 (14.4-16.5), and 15.7 (14.8-16.7) respectively. The only independent risk factor associated with viral suppression was having reported treatment fatigue AOR=4.84 (2.01 – 13.90). The protective factors were; being in an adolescent club [AOR=0.24: 95% CI (0.11 – 0.67)], being on first line ART [AOR=0.63: 95% CI (0.49 – 0.90)], and taking ART once a day [AOR=0.23: 95% CI (0.07 – 0.72)]. Medicines were available and there was robust viral load monitoring system in place in the whole district. In conclusion, this study offers valuable insights into the multifaceted determinants of viral load un-suppression among adolescents living with HIV in the Western District of Harare City. The findings highlight the importance of a holistic, patient-centered approach to HIV care and management. We therefore, recommend that program counselors should work closely with adolescents as well as their close family members so as to ensure a successful viral load suppression.

Key words: Adolescents, Anti-Retro Viral therapy, Viral load, Viral un-suppression, adherence

Declaration

I declare that this dissertation proposal is my original work, I have not copied from any other from any other sources except where reference or acknowledgement is made explicitly in the text. The work has never been written for me by another person or submitted to another institution for the award a masters' degree.

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Acknowledgments

The researcher would like to express heartfelt appreciation to Mr Patson Ndlovu (field supervisor, for their untiring guidance and mentorship throughout the proposal writing. His willingness to provide me with valuable input is so generous and greatly appreciated. Special thanks also go to the Director of Health for Harare City for permitting me to conduct this study.

Dedication

This work is dedicated to my beloved husband Ian Makone, my daughter Ayita, and my family who offered valuable advice and support in pursuing this study.

Abbreviations and acronyms

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
CD4	Cluster of Differentiation 4
HIV	Human Immune Deficiency Virus
MoH	Ministry of Health
PLHA	People Living with HIV/AIDS
UNAIDS	United Nations Program on HIV/AIDS
VL	Viral Load
WHO	World Health Organization

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CHAPTER 1 INTRODUCTION

1.1 Introduction

The leading global burden of disease is secondary to Human Immunodeficiency Virus (HIV) (UNAIDS, 2016). Greater progress has been made in improving access to antiretroviral therapy (ART) in individuals living with HIV. Suppression of the viral load is the main goal of ART, and this helps in restoring the immune function and reduction in onward transmission of HIV (Agwu & Fairlie, 2013).

Adolescents represent a growing number of people who are living with HIV worldwide and their mortality rate is higher than that of adults (Tugume, Muhwezi, Maud, & Ainamani, 2022). Worldwide more than 150 adolescents die daily due to Acquired Immune Deficiency Syndrome (AIDS) related illnesses (Pantelic, Casale, Cluver, & Toska, 2020). In 2017, 91% of the adolescents who died of AIDS worldwide were from Sub-Saharan Africa and the death rate has not reduced significantly (Casale, Carlqvist, & Cluver, 2019). In different parts of the world, the proportion of adolescents virally suppressed is lagging compared to adults (Haberet, et al., 2014).

1.2 Background to the study

The World Health Organization (WHO), recommended individual-level viral load as the measure of viral treatment adherence and efficacy (WHO, 2016). A stable patient on ART whose viral load is suppressed is defined as having success with treatment noted by a threshold of VL<50 copies/ml and has been on treatment for at least 6 months, having no current opportunistic infections, and should have a good understanding of life long adherence (MOHCC, 2016).

In the 2015 WHO consolidated strategic information guidelines of HIV, viral load suppression is one of the 10 global indicators (Evan, Menezes, Mohamed, MacdonaldL, & al, 2016).

In December 2020, UNAIDS launched a Global response towards achieving the 95-95-95 targets, 'the third '95', an initiative put in place to end the AIDS pandemic by 2030 (UNAIDS, 2020). This UNAIDS initiative aims at achieving 95% of the people living with HIV knowing their status, 95% of the people who know their status to adhere to treatment, and 95% of the people on treatment to have their viral load suppressed by 2025 (UNAIDS, 2020). Viral load suppression can be attained at a high rate in communities and even at country levels and some studies have identified some individual and institutional factors that are associated with the viral suppression of the general population samples (Bulage, Ssewanyana, Nankabirwa, Nsubunga, & al, 2017). However, there are factors with viral load un-suppression among adolescents that are not well documented in low-income countries like Zimbabwe.

Adolescents who were infected with HIV through high-risk behaviors had little optimal response to ART, with only 24% able to achieve and maintain an undetectable viral load over 3 years (Haberet, et al., 2014). Although a lot of studies have been conducted on the efficacy of ART in HIV children and adults, relatively less information has been collected describing the virology outcomes among adolescents who are living with HIV. According to WHO (2016), the number of adolescents who are on ART continues to increase which is a reflection of success in perinatal treatment, infection during adolescence, and the expansion of worldwide access to treatment (Zgambo, Kalembo, & Mbakaya, 2018).

Measures of the virology outcomes are essential as adolescents have unique behaviors that may lead to poor adherence to ART, hence leading to drug resistance and morbidity.

Human Immunodeficiency Virus (HIV) remains a significant global health challenge, particularly among adolescents. With advancements in antiretroviral therapy (ART), adolescents living with HIV have greater opportunities for a healthier life. However, achieving and maintaining viral load suppression remains a complex and multifaceted challenge, especially in the context of the Western District of Harare City in 2023.

The Western District, like many other urban areas, presents unique social, economic, and healthcare dynamics that influence the health outcomes of adolescents living with HIV. As this demographic continues to grow, understanding the determinants of viral load un-suppression becomes imperative for optimizing HIV care strategies.

Zimbabwe is ranked among the 30 countries with the highest HIV/AIDS disease burden and contributes 5% to adolescent death (ZIMPHIA, 2016). The deaths are mainly attributed to late diagnosis and also to poor access to treatment, as most of those with perinatal infection delay in seeking treatment. Like other countries, Zimbabwe continues to be committed to achieving the 95-95-95 targets by 2030 and the country is above targets on the first and second 95 but is slightly below target on achieving 95% on viral load suppression among those who are on treatment. To identify people who are on ART and are failing to adhere to treatment, the Zimbabwean government recommended viral-load testing of all people who are receiving treatment for at least 6months or more. Viral load suppression of adolescents was found to be lower than that of adults (Zvanaka, Elizabeth, & Mafuta, 2018). Zimbabwe is on track to achieving viral load suppression. According to a case-control study done by Zvanaka et al (2018), viral suppression in adults is 87% while adolescents achieved 44%

only. In the city of Harare, 57% of the adolescents had attained viral load suppression after one year of being on ART compared to the 88% obtained in adults (Zvanaka, Elizabeth, & Mafuta, 2018).

Adherence to ART is very important for viral load suppression. It is very important to continuously monitor the aspect of HIV/AIDS care to prevent reversing the gains achieved so far in the HIV/AIDS fight, which is in progress. There is a need to evaluate national progress in achieving the 95-95-95 targets, especially of having 95% of people living with HIV to be virally suppressed by the year 2030. It is also of paramount importance to look at the factors that determine viral load suppression in adolescents, in Zimbabwe. In Zimbabwe information among adolescents 10-19 years on viral load suppression is limited hence it is against this background that the researcher aims at identifying the factors that are associated with viral load suppression in the city of Harare, Western District.

1.2 Statement of the problem

According to the Zimbabwean viral load dashboard, the adolescent achieving viral load suppression lies at 81% which is lower than the recommended WHO target, of 95% by 2030 (Tichaona, Rhoderick, Vinie, & Caroline, 2018). Despite progress in HIV care, a considerable number of adolescents experience viral load un-suppression, leading to increased morbidity, mortality, and a higher risk of transmission. The factors contributing to viral load un-suppression among adolescents in the Western District of Harare City need to be systematically explored and understood to tailor effective interventions. A lot has been done in scaling up treatment and testing that includes interventions on making the medicines and supplies available and very affordable, little is known on the factors determining viral load un-suppression among adolescents living with HIV/AIDS. This is the age group that

has remained an outlier in the AIDS response. According to statistics provided by Harare city for the Western district, in the year 2021, 403 adolescents had their viral load tested and 53 had viral load results > 1000 copies, and in the year 2022, 92 adolescents out of 413 tested adolescents were virally unsuppressed. In this district viral load un-suppression increased from 13.15% to 22.28% and it is against this background that the researcher aims at determining the factors that are associated with viral load un-suppression among adolescents living with HIV.

1.3 Research objectives

1.3.1 Broad Objective

The purpose of this study is to determine the socio-demographic, client-related, and ART regimen-related factors associated with viral load un-suppression among adolescents living with HIV in care, Western District, Harare city, 2023. By identifying and understanding these determinants, the study aims to inform targeted interventions that address the unique challenges faced by this population.

1.3.2 Specific Objectives

The study will specifically seek to:

1) determine the socio-demographic factors associated with viral load un-suppression among adolescents living with HIV in care, Western District Harare City, 2023.
2) ascertain the client-related factors associated with viral load un-suppression among adolescents living with HIV in care, Western District Harare City, 2023.
3) establish the ART regimen-related factors associated with viral load un-suppression among adolescents living with HIV in care, Western District Harare City, 2023.

4) determine the HIV/AIDS knowledge levels among adolescents living with HIV in care, Western District, Harare City, 2023.
5) assess the availability of anti-retroviral medicines, and viral load monitoring services for adolescents living with HIV in care, Western District, Harare City, 2023.

1.4 Research Question

1. What are the socio-demographic factors associated with viral load un-suppression among adolescents living with HIV in care, Western District Harare City, 2023?
2. What are the client-related factors associated with viral load un-suppression among adolescents living with HIV in care, Western District Harare City, 2023?
3. What are the ART regimen-related factors associated with viral load un-suppression among adolescents living with HIV in care, Western District Harare City, 2023?
4. What are the HIV/AIDS knowledge levels of adolescents living with HIV in care, Western District, Harare City, 2023?
5. What anti-retroviral medicines and viral load monitoring services are available for adolescents living with HIV in care, Western District, Harare City, 2023?

1.4 Research Hypothesis

H_0: There is no association between HIV/AIDS knowledge levels and viral load un-suppression among adolescents living with HIV in care, Western District, Harare city, 2023.

H_1: There is an association between HIV/AIDS knowledge levels and viral load un-suppression among adolescents living with HIV in care, Western District, Harare city, 2023.

1.5 Significance of the study

Understanding the determinants of viral load un-suppression in the context of the Western District of Harare City is crucial for informing targeted interventions and healthcare policies. The findings will contribute to the existing body of knowledge on HIV care, providing insights that can improve the health outcomes of adolescents living with HIV in urban settings. Globally and regionally, it is apparent that strides are being taken in addressing treatment gaps among people living with HIV/AIDS. In recent years there has been quite a number of studies which focused on interventions to improve adherence to ART among people living with HIV/AIDS. The systematic reviews and the gaps described above present specific interventions and opportunities, they also highlight limited quantity and moderate quality of studies as well as evidence on factors that are affecting interventions on people living with HIV. Most researches include interventions for these adolescents despite focusing also on their viral load suppression. It is the aim of this study to assess the proportion of adolescents taking ART in routine healthcare settings who achieved low viral suppression to inform the need for interventions to improve HIV outcomes in an age group (adolescents) that may be at high risk of treatment failure. Findings from this study will be critical for policy making, program planners, and health authorities in managing the HIV pandemic. The findings will also help the district, the country and the global community in crafting interventions to address the VL un-suppression among adolescents in care.

Currently a lot of HIV positive children are growing into adolescents, thus the need to increase knowledge on how to keep them alive and health while also decreasing drug resistant issues that are coupled to high transmission rate in that age group. The proposed research will therefore, focus on determining the factors that are associated with viral load

un-suppression in adolescents. The aim being to propose programmatic recommendations and to widen the board of knowledge in identifying more factors that are potentially modifying and reinforcing hindering the achievement of viral load suppression in adolescents.

1.6 Delimitations of the Study

This study focuses specifically on adolescents living with HIV in care in the Western District of Harare City in 2023. This means that the research will be delimited to this geographic location and time frame i.e. the study will be limited to Harare Western District, focusing only on adolescents, that is children aged 10 to 19 years accessing their ART medication and viral load monitoring at the following health facilities in the Western District, Dzivarasekwa, Kuwadzana, Glenview, Mufakose and Budiriro.

1.7 Limitations of the study

The major limitation of this study would be the time and the availability of resources to conduct the research in the entire Western District of Harare. Funding is also a major challenge since the researcher is only a student, not employed. The other limitations may include potential biases in self-reported data and constraints in generalizing findings beyond the specified context.

1.8 Summary

The chapter has introduced the study on the factors determining the viral load un-suppression in adolescents living with HIV/ AIDS, in the Western District of Harare City. The background of the study was presented, giving an overview of the research area. The statement of the problem was then presented noting how cases of viral load un-suppression were increasing in adolescents compared to adults, especially in the local council clinics of

Harare. The research question was laid down and from this question, appropriate research objectives were formulated. This was followed by an account of the study's significance to both theory and practice. A discussion on the delimitation was made as well as the study limitations. Subsequent chapters will delve into a comprehensive exploration of the determinants of viral load un-suppression among adolescents living with HIV in the Western District of Harare City.

CHAPTER 2 REVIEW OF RELATED LITERATURE

2.1 Introduction

The global response to the HIV epidemic has seen significant progress in the provision of antiretroviral therapy (ART), particularly among adolescents. However, achieving viral load suppression remains a challenge, and understanding the determinants of viral load un-suppression is critical for enhancing HIV care outcomes. This literature review aims to explore existing research on the determinants of viral load un-suppression among adolescents living with HIV in care, focusing on the Western District of Harare City in 2023.

This chapter looks at the different existing sources of literature on the factors associated with viral load un-suppression among adolescents living with HIV/AIDS in care. It consists of reviewed literature on the socio-demographic factors, the client-related factors, and the ART regime related factors influencing viral load suppression among adolescents living with HIV/AIDS regionally and internationally. The recommended monitoring approach to ARV treatment and diagnosis is viral load monitoring (WHO, 2016). Global health strategy recommended that 95% of people who are living with HIV should know their status, 95% of the individuals that are diagnosed with HIV should receive treatment, and that 95% of individuals who are on treatment and know their status should achieve viral load suppression. These individuals include adolescents (WHO, 2020).

In two cities in Africa, Carmona et al (2018) state that the proportion of individuals that are virally suppressed by having copies <1000 per mm^3 doubled from less than 40% to about 80%. Also, in Rwanda people on ART are virally suppressed achieved in 18 months of ART

initiation are at 86%, while Senegal lies at 80% of people on ART and are virally suppressed for five years from start of treatment (WHO, 2021).

In another study conducted in South Africa, virological failure rate was at 8.2% in adolescents while it was 5.0% in young adults (Ngilazi et al, 2016). This indicates a significant higher virologic failure rate in adolescents than in adults. Six studies that reported on viral load suppression in a peer review indicated an increase in adolescents with a viral load un-suppression from 27% to 89% (Mujugira, Celum, Tappero, R onald, & Mugo, 2016).

In another study done in Uganda, it indicated that at 12, 75 of the patients had undetectable viral load and at 24 months 72% had undetectable virus, less than 400 copies/ml. However, the age consideration was 15 years and above, it did not take into account adolescents only (Ahoual, 2017). A study by Kamya et al (2007) highlighted that children (0-18 years) were most likely to have viral load un-suppression than adults. Generally, there is limited information on viral load suppression among adolescents both regionally and globally.

2.2 Conceptual Framework

The conceptual framework below illustrates the relationship that exists between the dependent and independent variables looking at how they influence the suppression of viral load among adolescents who are on ART. In this particular study research, viral load suppression is the dependent variable. Background factors which include gender, age, educational level, family members, religion, and intermediate factors such as the duration of the current regimen, ART regimens age of initiation as well as the provider-client factors might also affect adolescents' suppression of viral load (Eric, Judith, Robert, & Geri, 2019).

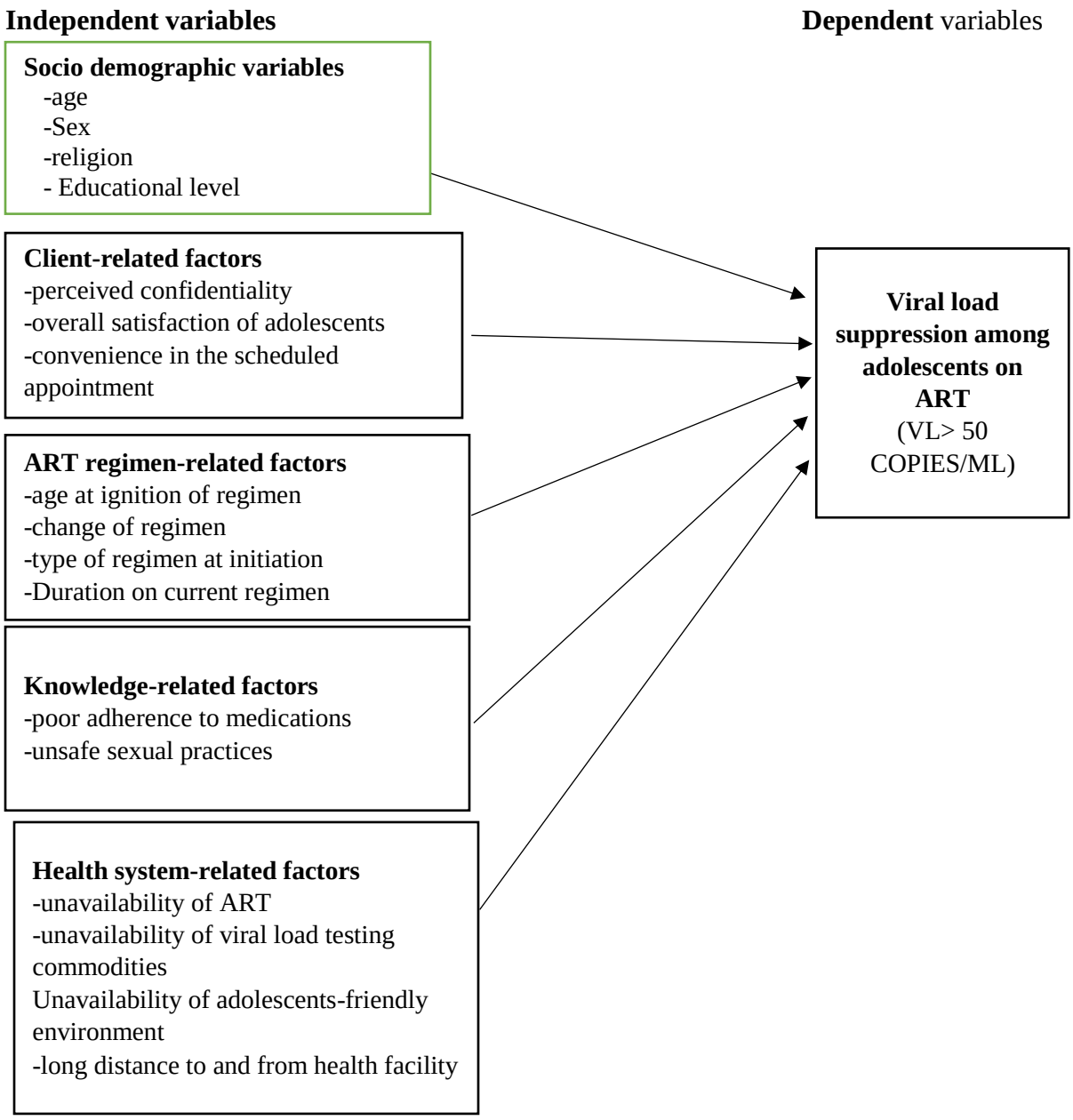

Figure 1: Conceptual Framework (Eric, Judith, Robert, & Geri, 2019)

2.3 Relevance of the Conceptual Framework

2.3.1 The Socio-Demographic Factors of Adolescents on ART Influencing Viral Load Suppression

2.3.1.1 Gender of Adolescents and its Influence on Viral Load Suppression

The influence of sex on viral load suppression among adolescents living with HIV on antiretroviral therapy (ART) is a crucial aspect to consider in understanding determinants of viral load un-suppression. The studies below examined the influence of sex on viral load suppression among adolescents living with HIV.

1. Adherence Patterns by Sex:
    - Studies have shown variations in adherence to ART by sex among adolescents living with HIV. While some studies suggest that females may have higher adherence rates compared to males (Mavhu et al., 2013), others report no significant differences (Lowenthal et al., 2014).
2. Biological Differences:
    - Biological differences between males and females, such as hormonal fluctuations and metabolism, may influence the pharmacokinetics and efficacy of ART drugs. Variations in drug metabolism and distribution could impact treatment adherence and viral load suppression outcomes (Ramadhani et al., 2014).
3. Social and Cultural Factors:
    - Social and cultural factors related to gender roles and expectations may influence treatment adherence behaviours among adolescents living with HIV. Societal norms regarding masculinity and femininity could affect healthcare-seeking behaviours, disclosure of HIV status, and adherence to ART (Pengpid et al., 2019).
4. Barriers to Care:

- Gender-specific barriers to HIV care, such as stigma, discrimination, and gender-based violence, may disproportionately affect adolescents' access to healthcare services and adherence to treatment. Females, in particular, may face additional challenges related to reproductive health and pregnancy, which could impact treatment adherence and viral load suppression (Nabukeera-Barungi et al., 2015).

5. Psychosocial Support Needs:
    - Adolescents living with HIV may have unique psychosocial support needs based on their sex. Females may require additional support related to reproductive health, family planning, and prevention of mother-to-child transmission, while males may benefit from interventions targeting masculinity norms and peer support networks (Mutumba et al., 2017).
6. Gender-sensitive Interventions:
    - Gender-sensitive interventions that address the specific needs and challenges faced by male and female adolescents living with HIV are essential for promoting viral load suppression. Tailored approaches, such as gender-responsive counselling, peer support groups, and empowerment programs, can enhance treatment adherence and improve health outcomes (Cluver et al., 2015).

Sex differences play a significant role in influencing viral load suppression among adolescents living with HIV on ART in the Western District of Harare City. Understanding the complex interplay of biological, social, and cultural factors is essential for developing gender-sensitive interventions to address determinants of viral load un-suppression and promote optimal health outcomes in this population.

Gender differences play a role in HIV outcomes. Research by Dyer et al. (2017) suggests that gender norms and societal expectations may influence health-seeking behaviors and

adherence patterns among male and female adolescents. In a study carried out in the United States whose results were presented at the 9th International Conference on HIV Prevention, Treatment and Adherence conducted in 2014, 31% of women in care were virally un-suppressed while men were 26% ((Beer, Mattson, Short, & Skarbinski, 2014). In a study by Davies et al (2014), it was reported that viral load response to ART is gender specific, however, in this study the viral load suppression rate and gender disparities were not specified.

Some studies such as the one conducted in Swaziland, state that viral load suppression was not associated with gender (Jobanputra, et al., 2017). A study also conducted in Uganda reported independent predictors of viral load un-suppression including male gender with an odds of 2.44 (Kamya, et al., 2010).

2.3.1.2 Age of the Adolescents on ART and its Influence on Viral Load Suppression

The age at which adolescents initiate antiretroviral therapy (ART) can significantly impact their adherence to treatment and viral load suppression. Understanding how age influences these outcomes is essential for addressing determinants of viral load un-suppression among adolescents living with HIV. Existing research on the influence of adolescents' age on viral load suppression while on ART yielded the following:

1. Early Initiation of ART:
    - Studies have shown that early initiation of ART, particularly during childhood or adolescence, is associated with better long-term treatment outcomes, including viral load suppression (Lowenthal et al., 2014).

- Adolescents who start ART at a younger age may have fewer treatment interruptions, better medication adherence, and lower risk of developing drug resistance, leading to sustained viral suppression (Kerr et al., 2014).

2. Adolescent-Specific Challenges:
    - Adolescence is a period of significant developmental and psychosocial changes, which can pose unique challenges to ART adherence and viral load suppression (Nabukeera-Barungi et al., 2015).
    - Older adolescents may experience increased autonomy and responsibility for their healthcare decisions, but they may also face competing priorities, such as school, work, or relationships, which can impact their ability to adhere to treatment (Ramadhani et al., 2014).
3. Transition from Paediatric to Adult Care:
    - Adolescents transitioning from pediatric to adult HIV care services may experience disruptions in care continuity, which can affect viral load suppression (Wachira et al., 2014).
    - Challenges during the transition period, such as loss of pediatric support systems, unfamiliarity with adult healthcare settings, and fear of stigma or discrimination, may contribute to suboptimal adherence and viral load un-suppression (Dow et al., 2018).
4. Developmentally Appropriate Interventions:
    - Interventions tailored to the developmental needs and preferences of adolescents can improve ART adherence and viral load suppression outcomes (Mutumba et al., 2017).

- Age-appropriate education, counselling, peer support programs, and mobile health technologies have been shown to enhance adolescents' engagement in care and adherence to treatment, leading to better viral load suppression (Cluver et al., 2015).

5. Parental/Guardian Involvement:
    - Involvement of parents or guardians in adolescents' HIV care can positively influence treatment adherence and viral load suppression, especially for younger adolescents (Richter et al., 2014).
    - Family-centered approaches that promote communication, shared decision-making, and support from caregivers can mitigate the challenges associated with ART adherence and viral load un-suppression among adolescents of all ages (Pengpid et al., 2019).

The age of adolescents on ART significantly influences viral load suppression outcomes in the Western District of Harare City. Early initiation of ART, adolescent-specific interventions, smooth transition to adult care, and parental/guardian involvement are essential factors to consider in addressing determinants of viral load un-suppression among adolescents living with HIV.

Several studies (Mofenson et al., 2017; Zanoni et al., 2018) have highlighted the impact of age on viral load suppression among adolescents living with HIV. Younger adolescents may face challenges in adhering to treatment due to factors such as cognitive development and dependence on caregivers.

A lot of studies have indicated that viral load suppression is strongly associated with age. For example, a study done in Uganda, concluded that viral load suppression was more in

adults being at 84% than in children where it lied at 74% (Kamya, et al., 2010). In this study it was further reiterated by health care providers that lack of viral suppression was mainly in young adolescence. Younger age was associated with cessation of ART treatment resulting in virological failure. Moreover, younger age 15- 22 years was also independently associated with viremia episodes after their initial viral load suppression compared to individuals greater than 35 years of age (Kamya, et al., 2010). Overall, younger age groups have more challenges issues with adherence to ART treatment and therefore, having difficulty with their viral load suppression.

In another study, reported by Michigan Department of Community Health, it was concluded that infected youth aged between 13-25years are more likely to be in HIV care but less likely to be virally suppressed (MDCH, 2014).

Research by Evans, et al (2014), states that older adolescents are more likely to have viral load un-suppression at six months while young adolescents are likely to have their viral load un-suppressed at 12months. The virological failure rate of young adolescents is at 6.3% in comparison to older adults who are at 3.8% 9 (Evans, et al., 2014).

A prospective study conducted in British Columbia revealed that 1305 HIV positive infected persons on ART, younger ages tend to be independently associated with viral rebound after the initial viral suppression. (Mujugira, Celum, Tappero, R onald, & Mugo, 2016).

Young adolescents aged 10 to 15years are more likely to achieve favorable immunological response at 6 months after initial ART initiation but are likely to have high likelihood of detectable viral load at 12months, this was revealed in a study by (Evans et al., 2013). This study further highlighted that both short- and long-term virological outcomes of HIV

positive adolescents were poorer than that of adults. The study revealed that 59% and 23% of the study adolescents meeting the study success of virologic success at 24 weeks and 3years respectively.

2.3.1.3 Family composition and influence on Viral load Suppression in adolescents

Family composition plays a crucial role in shaping the health outcomes of adolescents living with HIV, particularly in the context of viral load suppression. Understanding how different family structures influence adherence to antiretroviral therapy (ART) and viral load suppression is essential for designing targeted interventions to improve health outcomes among this population. Studies done by Bhana et al. (2014), Lowenthal et al. (2015), Mavhu et al. (2013), Richter et al. (2014) and Cluver et al. (2015) explored the influence of family composition on viral load suppression in adolescents living with HIV and documented their findings as below:

1. Single-Parent Households:
    - Adolescents living with HIV in single-parent households may face increased caregiving responsibilities and financial strain, which can impact adherence to ART and viral load suppression (Bhana et al., 2014).
    - Research suggests that single-parent households may experience higher rates of treatment interruptions and suboptimal adherence due to limited parental support and resources (Lowenthal et al., 2015).
2. Two-Parent Households:
    - Adolescents living with HIV in two-parent households often benefit from increased emotional and financial support, as well as shared caregiving responsibilities,

which can facilitate adherence to treatment and viral load suppression (Mavhu et al., 2013).

- Studies have found that family cohesion and stability in two-parent households are associated with improved health outcomes and better adherence to ART among adolescents living with HIV (Richter et al., 2014).

3. Extended Family Structures:
    - Extended family structures, such as households with grandparents or other relatives, are common in many African communities and can provide additional sources of support for adolescents living with HIV (Cluver et al., 2015).
    - However, overcrowding, financial constraints, and potential conflicts within extended families may also pose challenges to healthcare access and adherence to ART, affecting viral load suppression outcomes (Ezeanolue et al., 2018).
4. Orphanhood and Caregiver Status:
    - Adolescents who have lost one or both parents to HIV/AIDS may face unique challenges related to orphanhood and caregiver status, which can impact adherence to treatment and viral load suppression (Mutumba et al., 2017).
    - Studies suggest that adolescents living with non-biological caregivers may experience disruptions in care continuity and emotional support, leading to suboptimal health outcomes (Pengpid et al., 2019).
5. Family Support and Communication:
    - Strong family support and open communication about HIV/AIDS are crucial for promoting adherence to ART and viral load suppression among adolescents living with HIV (Zimmerman et al., 2017).

- Families that openly discuss HIV-related issues, provide encouragement, and foster a supportive environment are more likely to facilitate optimal health outcomes in adolescents living with HIV (Pope et al., 2012).

Family composition significantly influences viral load suppression among adolescents living with HIV. Therefore, Interventions aimed at strengthening family support, improving communication, and addressing the unique needs of adolescents in different family structures are essential for promoting optimal health outcomes in this population.

A study conducted in Cambodia reported that family composition is very important in achieving viral load suppression and this was noted by having adolescents or children with no parents are at a higher risk of failure than those with at least one parent (Junseen et al., 2012). Young individuals that are chronically ill may be less mature and their caregivers play an important role in their lives, by ensuring that they adhere to the treatment therapy. However, some come from poor socio-economic backgrounds and some are orphaned by AIDS and as result are running a child headed family (Evans et at., 2013).

As a result, psychosocial problems arise and there is poor adherence to the treatment therapy. (Evans et al., 2013) also elaborated that establishing more specialize adolescents' health care clinics in many countries is providing more enhanced targeted testing and counselling in line with the particular need of the HIV positive child or adolescent. Such countries include Zimbabwe were at every clinic is found an adolescent corner, where they are addressed separately from the rest of the population.

2.3.1.4 Religion of an Adolescent and its Influence on Viral Load Suppression

The influence of religion on health outcomes, including viral load suppression among adolescents living with HIV, is a multifaceted and complex area of study. Understanding

how religious beliefs, practices, and community engagement impact viral load suppression is crucial for developing effective interventions to improve HIV care among adolescents. This literature review explores existing research on the influence of religion on viral load suppression among adolescents living with HIV in the Western District of Harare City in 2023.

Religion plays an important role in giving hope to the hopeless, but in the process, this can play a positive or negative role in the treatment of HIV. There are so many tales of staunch religious people abandoning their medical treatment therapy in the hope of being cured by their religious beliefs, only to relapse resulting in very high viral loads in the long term. This is supported by a study conducted in Kampala, Congo, where some patients discontinue medications claiming to be healed from HIV after prayers (Gare et al., 2015). This study further reveals that about 10% of the study participants narrated that going to church was a way of avoiding getting infected with HIV. However, about 30% claimed to have gotten support on ART adherence from the church.

The religious belief systems of individuals play a very critical role in their adherence to ART treatment regimens (Zvanaka, Elizabeth, & Mafuta, 2018). Some adolescents specified that their prophets or pastors informed them to abandon their medical ART regimens as they claimed were healed. Some adolescents who also believe in and use traditional medicines were told to leave the medical ART drugs and adhere to the traditional medicines (Baya, et al., 2017). However, some were informed not to use ART treatment simultaneously with traditional and religious ART treatment (Baya, et al., 2017).Several authors have outlined how religion may influence viral load suppression among adolescents living with HIV in care. These include:

1. Religious Beliefs and Coping Mechanisms:
    - Religion can provide adolescents with a framework of beliefs and values that influence their coping mechanisms and attitudes toward illness and treatment. Adolescents who draw on religious beliefs for support may exhibit greater resilience and optimism in managing their HIV diagnosis and adhering to treatment, potentially leading to improved viral load suppression.
2. Community Support and Social Networks:
    - Religious communities often provide a source of social support and belonging for adolescents. Adolescents who are actively involved in religious communities may benefit from supportive relationships with peers, mentors, and spiritual leaders, which can positively influence mental health and adherence to antiretroviral therapy (ART), ultimately contributing to viral load suppression.
3. Stigma Reduction and Acceptance:
    - Religion may promote acceptance and reduce stigma associated with HIV/AIDS within communities. Adolescents who feel accepted and supported by their religious community are more likely to disclose their HIV status, seek medical care, and adhere to treatment without fear of judgment or discrimination, which can facilitate viral load suppression.
4. Health Promotion and Education:
    - Religious organizations often engage in health promotion and education activities, including HIV/AIDS awareness campaigns and counselling services. Adolescents who participate in religious activities may receive information about HIV prevention, treatment, and adherence, leading to improved health literacy and

empowerment to manage their HIV care effectively, thereby enhancing viral load suppression outcomes.

5. Spiritual Well-being and Psychological Resilience:
    - Religion can foster spiritual well-being and provide adolescents with a sense of purpose, meaning, and hope, which are important aspects of psychological resilience. Adolescents who experience spiritual growth and inner strength through their religious beliefs may better cope with the challenges of living with HIV, maintain a positive outlook on life, and adhere to treatment, resulting in viral load suppression.
6. Ethical and Moral Values:
    - Religious teachings often emphasize ethical and moral values, including responsibility, compassion, and altruism. Adolescents who internalize these values may be motivated to prioritize their health and adhere to treatment out of a sense of duty to themselves, their families, and their religious community, thereby promoting viral load suppression (Ezeanolue et al. (2018), Mutumba et al. (2017), Wachira et al. (2014), Pope et al. (2012) and Zimmerman et al. (2017)).

While religion can play a significant role in influencing viral load suppression among adolescents living with HIV, it's important to recognize that individual experiences may vary based on factors such as religious affiliation, level of engagement with religious practices, and personal beliefs. Conducting qualitative research to explore the lived experiences of adolescents with regard to religion and its influence on viral load suppression can provide valuable insights for addressing this determinant in the Western District of Harare City.

2.3.1.5 Educational Status and its Influence on Viral Load Suppression

Studies from sub-Saharan Africa (SSA) document how barriers to ART adherence present additional complications among adolescents and young adults living with HIV. Four barriers to ART adherence emerged: 1) poverty limited adolescents' ability to buy food and undercut efforts to become economically independent in their transition from adolescence to adulthood; 2) school attendance limited their privacy, further disrupting ART adherence; 3) family support was unreliable, and youth often struggled with a constant change in guardianship because they had lost their biological parents to HIV. In contrast, peer influence, especially among HIV-positive youth, was strong and created an important network to support ART adherence; 4) the burden of taking multiple medications daily frustrated youth, often leading to so-called 'drug holidays.' Adolescent and youth-specific issues around disclosure emerged across three of the four barriers (Nabukeera-Barungi et al., 2015). According to research conducted in United States at HIV clinics done between June and September 2010, lower educational levels were associated with lower adherence level to the HIV treatment regimen compared to individuals with higher educational levels (33% vs 23%, $p<0.05$) (Shasham et al., 2010). A study done in Uganda found that adolescents with higher levels of education were more likely to adhere to antiretroviral therapy and remain in care, leading to improved viral load suppression **(**Nabukeera-Barungi et al., 2015**).** These researchers also concluded that school staff could develop strategies to help students take their medications consistently and confidentially to improve adherence.

A study conducted by Ramadhani et al (2014) in Tanzania identified predictors of incomplete adherence and virologic failure among adults receiving antiretroviral therapy. While not specific to adolescents, the findings underscore the importance of education in

achieving viral load suppression. Another study done by Wachira et al (2014) in western Kenya also noted that lack of education among adolescents hindered their ability to navigate the healthcare system effectively and access necessary services for viral load suppression, whilst results from a randomized control trial in South Africa done by Ritcher et al (2014), showed that participants with higher educational levels were more likely to engage with peer support, leading to improved adherence and viral load suppression.

2.3.1.6 Poverty and its influence on viral load suppression

The influence of poverty on viral load suppression among adolescents living with HIV is a critical aspect to consider in understanding the determinants of viral load un-suppression. Life outside the health care facility has significant effects on the ability of adolescents to follow up on instructions related to their treatment regimens (Bernays, 2016). Economic factors such as poverty play a very important role in adherence to ART and viral load suppression. Competing demands for transport to healthcare facilities, school fees, and food, create barriers to adolescents from receiving the health care they need (Pantelic, Casale, Cluver, & Toska, 2020).

1. Limited Access to Healthcare Services:
    - Adolescents from impoverished backgrounds may face barriers to accessing healthcare services, including transportation costs, lack of health insurance, and long distances to healthcare facilities. As a result, they may experience delays in receiving medical care and obtaining antiretroviral therapy (ART), which can contribute to viral load un-suppression.
2. Inadequate Nutrition:

- Poverty often correlates with food insecurity and inadequate nutrition. Adolescents living with HIV who experience food insecurity may struggle to maintain a healthy diet necessary for optimal medication absorption and immune function. Poor nutrition can compromise the effectiveness of ART and lead to viral load un-suppression.

3. Suboptimal Adherence to ART:
    - Economic hardship can lead to challenges in adhering to ART regimens. Adolescents from impoverished households may prioritize competing needs over medication expenses, leading to inconsistent adherence. Suboptimal adherence to ART is a key predictor of viral load un-suppression and disease progression among adolescents living with HIV.
4. Stress and Mental Health Challenges:
    - Poverty is often associated with chronic stressors, including unstable housing, unemployment, and family conflict. Adolescents living in poverty may experience higher levels of psychological distress, which can negatively impact mental health and coping mechanisms. Mental health challenges, if left unaddressed, can contribute to suboptimal medication adherence and viral load un-suppression.
5. Lack of Social Support:
    - Adolescents from impoverished backgrounds may have limited access to supportive social networks and resources. The absence of supportive relationships, such as family or community support, can exacerbate feelings of isolation and hopelessness, making it difficult for adolescents to adhere to treatment recommendations and achieve viral load suppression.

6. Barriers to Education and Empowerment:
    - Poverty often limits educational opportunities and access to information. Adolescents living in poverty may have lower health literacy and awareness of HIV/AIDS and treatment options. Lack of education and empowerment can hinder adolescents' ability to advocate for their healthcare needs, engage in shared decision-making with healthcare providers, and effectively manage their HIV treatment, leading to viral load un-suppression.

Addressing the influence of poverty on viral load suppression among adolescents living with HIV requires comprehensive strategies that address social determinants of health, including poverty alleviation programs, access to affordable healthcare, nutritional support, mental health services, and educational empowerment initiatives. By addressing the root causes of poverty and implementing targeted interventions, it is possible to improve viral load suppression outcomes and enhance the overall well-being of adolescents living with HIV (Cluver L. D., et al, Dow D. E., et al, Mutumba M. and Kerr J. C., et al).

Most of the reviewed records assessed in studies done in Zimbabwe included minimal information on nutrition status despite guidelines from the Ministry of Health. However, in another study, where data was available, 13.8% adolescents had severe malnutrition at ART initiation and 78.1% of these adolescents achieved viral load suppression (Nicole, et al., 2021). Of the 3% of adolescents who had moderate malnutrition at ART initiation, only half (50%) achieved viral load suppression. With limited information and a few studies conducted it is difficult to ascertain why adolescents with moderate malnutrition do not achieve better rates on viral load suppression. One possible explanation that was given in another study highlighted by caregivers in the qualitative interviews was that nutrition services at most healthcare facilities target severely malnourished adolescents, whilst those

with moderate malnutrition were usually not given specialized treatment and support. (Nicole, et al., 2021).

Generally, availability of food plays a major role in fostering adherence to Art among adolescents. Some caregivers in a study conducted in Uganda highlighted that due to poverty they could not afford to consistently provide adequate nutritional food for their children (Chhim, et al., 2018). Living in poverty, therefore, created a challenge in convincing adolescents to take their ART drugs in the absence of food (Chhim, et al., 2018). In a different study conducted in Uganda, some adolescents reported that they experience severe abdominal pains when they take medicines on empty stomach, so this makes them to be reluctant in taking their ART medication (Nabukera-Burungi, et al., 2015). Non-adherence to Art treatment in adolescents is further worsened by lack of transport money to travel to the healthcare facilities, especially in rural areas, and this result in loss to follow leading to viral load un-suppression (Nabukera-Burungi, et al., 2015). Socioeconomic status has been identified as a significant determinant (Auld et al., 2018). Adolescents from lower socioeconomic backgrounds may face barriers such as limited access to healthcare, transportation issues, and financial constraints impacting their ability to adhere to ART.

2.3.2 Art Regimen Related Factors and their Influence on Viral Load Suppression among Adolescents

2.3.2.1 Type of ART Regimen at Initiation and its Influence on Viral Load Suppression

Adherence to Art treatment regimen is very crucial for avoidance of drug resistance and maximum viral load suppression. Use of Ritonavir and Nevirapine, used as a single dose

was associated with an increased failure risk compared to use of Efavirenz based regimen (Davies, et al., 2016). According to a study conducted in Atlanta Georgia, by (Edson at al., 2014), reviled that not only were person at an early stage of diagnosis, phase1, likely to have viral load suppression than those at stage 3, even though ART is recommended for both stages.

Biological plausible explanation to poor adherence is as a result of drug dosages that is below levels necessitating production of the therapeutic effect and this therefore, enables the existence of drug resistance leading to viral load un-suppression among adolescents (Baya, et al., 2017). A study conducted in Northern Uganda revealed an increasing adolescent's proportion with detectable viral un-suppression for more than 3 years (Tugume, Muhwezi, Maud, & Ainamani, 2022). This also was attested by one study done in Kampala, Uganda stating that ART duration greater than 36 months also increased the risk of viremia marginally (Chhim, et al., 2018). These study findings may therefore, suggest that being on ART for a longer duration is a risk factor for viral load un-suppression and this may probably be due to treatment fatigue. A study conducted in Kwazulu-Natal South-Africa, reviled that non-TDF treatment regimens have a significant increase to high viral load by up to sevenfold (Davies, et al., 2016). This finding may have been due to lack of combined ART pills treatment regimens, as adherence is better in a combined treatment regimen (Casale, Carlqvist, & Cluver, 2019). Hence, it is of great importance to note that being on a Tenofovir based regimen improves viral load suppression in adolescents since it is easier to administer as it comes as a combined drug (Baya, et al., 2017).

Experiencing side effects was cited as one of the causes for suspending ARV treatment in a lot of studies, despite the current treatment regimen having fewer side effects as compared

to the old regimen which was phased out (Agwu & Fairlie, 2013). In some studies adolescents indicated that they are more distressed by ART drugs side effects as these evidently indicate their HIV positive status and thus increasing their chances of being stigmatized (Davies, et al., 2016). There has been documentation in some studies that the previous intermittent courses that were used in treating opportunistic infections resulted in archived drug resistance (Davies, et al., 2016). It is therefore, of paramount importance to establish the previous drug history as exposure to any of the drug can archive resistance and hence, despite adequate adherence, the adolescent ma fails to suppress the virus.

2.3.2.2 Change of Regime and its Influence on Viral Load Suppression

When considering the influence of changing ART regimes on viral load suppression, relevant literature might cover the following aspects:

1. **Regimen Switching and Virological Outcomes:**
    - Studies examining the impact of switching ART regimens on virological outcomes, including viral load suppression.
    - Exploration of reasons for changing regimens, such as treatment failure, drug resistance, or side effects.
2. **Adherence Challenges Post-Regimen Change:**
    - Research discussing potential adherence challenges faced by adolescents after switching ART regimens.
    - Identification of factors influencing adherence during and after the transition to a new treatment plan.
3. **Clinical Guidelines and Recommendations:**

- Review of clinical guidelines and recommendations regarding ART regimen changes, especially in the context of adolescents.
- Exploration of how healthcare providers navigate decisions related to regimen changes based on clinical assessments.

4. **Impact of Regimen Complexity on Adherence:**
    - Studies addressing how the complexity of different ART regimens may impact adherence levels among adolescents.
    - Examination of simplified regimens and their potential positive effects on treatment adherence.
5. **Psychosocial Factors Post-Regimen Change:**
    - Investigation of psychosocial factors, such as stigma, mental health, and social support, and how they may be influenced by regimen changes.
    - Understanding the interplay between psychosocial well-being and viral load outcomes post-regimen change.
6. **Long-Term Effects and Sustained Viral Suppression:**
    - Research exploring the long-term effects of changing ART regimens on sustained viral suppression.
    - Analysis of the durability of viral load suppression following regimen modifications.

According to WHO (2018) drug resistance from treatment failure as well as from newly infected people is becoming an issue of concern. A report from the Ministry Of Health stated that about 11.6% of ART patients have shown evidence of drug resistance in Zimbabwe (MOH, 2020). Report from the Pharm African Studies to Evaluate Resistance PSSER) done between 2008 and 2012 discovered that more Zimbabweans who were never on ART had a

higher HIV drug resistance than in other African countries, having increased from 8.2 to 12% over the 5-year period. The complexity of the ART regimen can impact adherence. Research by Nachega et al. (2019) indicates that adolescents on complex regimens may face challenges, leading to suboptimal adherence and subsequent viral load non-suppression.

Adverse side effects of antiretroviral drugs may influence treatment adherence (Mellins et al., 2017). Adolescents experiencing unpleasant side effects may be more prone to interrupting their treatment, affecting viral load suppression. The duration of treatment has implications for adherence. Prolonged treatment may lead to fatigue or treatment fatigue, affecting motivation to adhere consistently (Kim et al., 2016).

2.3.2.3 Duration on current regimen and its influence on VL suppression

Quite a number of studies have clarified the high level of adherence needed for successful long-term viral suppression. In a study conducted in United State, patients were recruited from the university of California hospital and clinics at a Veterans Affairs medical center, for those patients whose baseline VL was not detectable, there were no patients with adherence less than or equal to 95% who had viral un-suppression compared with the 41% of those with greater than 95% adherence (Bangsberg and Machtinger, 2010).

Similarly in a study conducted in British, 886 treatment individuals were followed to find their estimated pharmacy refill data adherence. The individuals prospectively followed for a median of 19 months after their initiation on ART. Of the individuals followed, 502 people were at the 95-100% adherence rate, and of these only 84% had achieved plasma viral loads (Rodrich, 2012).

2.3.2.4 Routine Viral load testing and its influence on Viral load suppression

Routine viral load testing is a critical component of HIV care management, particularly for adolescents living with HIV. The literature review below explores the existing research on the influence of routine viral load testing on viral load suppression among adolescents living with HIV in care.

1. Early Detection of Virological Failure:
    - Routine viral load testing allows for the early detection of virological failure, enabling healthcare providers to intervene promptly with treatment optimization or adherence support interventions. Adolescents who undergo regular viral load monitoring are more likely to achieve and maintain viral load suppression (Jiamsakul et al., 2014).
2. Guiding Treatment Decision-making:
    - Viral load testing provides valuable information for guiding treatment decision-making, such as switching to alternative antiretroviral therapy (ART) regimens in cases of treatment failure or drug resistance. Adolescents with access to routine viral load testing are more likely to receive timely adjustments to their treatment regimens, leading to improved viral load suppression outcomes (Phanuphak et al., 2014).
3. Enhanced Adherence Counselling:
    - Routine viral load testing can serve as a tool for enhancing adherence counselling and support interventions. Adolescents who receive feedback on their viral load results may be motivated to improve adherence to ART and engage more actively in their HIV care management (Karcher et al., 2015).
4. Monitoring Treatment Response:

- Regular viral load testing allows healthcare providers to monitor treatment response over time and assess the effectiveness of ART in suppressing viral replication. Adolescents with sustained viral load suppression are less likely to experience disease progression, opportunistic infections, and HIV-related complications (Ssali et al., 2016).

5. Addressing Barriers to Care:
    - Routine viral load testing helps identify barriers to care, such as medication non-adherence, treatment interruptions, or healthcare access issues, which may contribute to viral load un-suppression among adolescents living with HIV. Targeted interventions can be implemented to address these barriers and improve viral load suppression outcomes (Kerr et al., 2014).
6. Promoting Viral Load Suppression Goals:
    - Routine viral load testing supports the achievement of viral load suppression goals outlined in national and global HIV treatment guidelines. Adolescents who undergo regular viral load monitoring are more likely to achieve the desired target of undetectable viral load levels, reducing the risk of HIV transmission and improving overall health outcomes (Pham et al., 2019).

Routine viral load testing plays a crucial role in promoting viral load suppression among adolescents living with HIV in the Western District of Harare City. By facilitating early detection of virological failure, guiding treatment decisions, enhancing adherence counselling, and monitoring treatment response, routine viral load testing contributes to improved health outcomes and quality of life for adolescents living with HIV.

Targeted and routine viral load testing in adolescents throughout their treatment is very fundamental in making clinical decisions that will achieve viral load suppression and this reduces their morbidity and mortality due to HIV (Haberet, et al., 2014). This also helps in detecting HIV drug resistance (HIVDR). HIV drug resistance influences virological failure to suppress on ART and subsequently leading to mortality and mortality (Tichaona, Rhoderick, Vinie, & Caroline, 2018) . Adolescents with a high viral load, upon ART initiation may need more time to achieve virological load suppression and are usually predisposed into developing HIVDR and thus leading to increased mortality rates (Zvanaka, Elizabeth, & Mafuta, 2018). In a study conducted in Malawi, majority of adolescents in that study were on first-line Nevirapine (NVP) and their reviewed records indicated that about 33.8% (one-third) of adolescents maintained the treatment regimen given on their ART initiation while about (39%) one-third had to switch to another regimen due to treatment failure (Zgambo, Kalembo, & Mbakaya, 2018). Routine testing was the main reason for a detecting vial load un-suppression. In another study conducted in Zambia, there was a visibly noticeable increase in the proportion of adolescents who had several viral load tests after post-intensive adherence counselling sessions, ranging from 1.3 in 2017 to 5.2% in 2019 (Evans, 2015).Viral load testing for suspected treatment failure in adolescents was increasingly noticeable. The reviewed records in Malawi showed that suspected treatment failure was the main reason for repeating viral load test in adolescents. (Zgambo, Kalembo, & Mbakaya, 2018)

2.3.3 Client Related Factors and their Influence on Viral Load Suppression

Mental health challenges, including depression and anxiety, have been associated with viral load non-suppression (Haberer et al., 2017; Betancourt et al., 2016). Stigma and discrimination may contribute to mental health issues, affecting treatment adherence. Substance use, including alcohol and drug abuse, has been identified as a risk factor for viral load non-suppression (Macdonell et al., 2018). Substance use may interfere with treatment adherence and overall health-seeking behaviors.

2.3.3.1 Perceived confidentiality and its influence on vial load suppression

A lot of studies done in Africa had shown that HIV positive adolescents who attend health care services at adult-oriented health institutions are less likely to commence on ART, achieve viral load suppression and to adhere treatment regimen compared to adults. Moreover, there are an increase number of adolescents entering in adult oriented clinics, especially in the public health institutions, but there are very few criteria which guide health staff on the strategies to treat adolescents within such settings. The adult oriented HIV/AIDES care model does not meet the unique challenges faced by adolescents in the care of HIV (Evans et al., 2013).

In line with this the Zimbabwean National Adolescents Health Policy emphasized that there is need for, private, confidential, conducive and accessible health services in order for adolescents to access and use HIV treatment regimens effectively (MOH, 2016). The Zimbabwean government has tacked this issue by having adolescents' corner and Community Adolescent Treatment Supporters (CATS) where psychological support, retention to care and adherence to ART are implemented (Nicole, et al., 2021).

2.3.3.2 Disclosure and its influence on viral load suppression

The level of HIV disclosure and social support are critical factors (Bhana et al., 2014). Positive social support and open communication about HIV status have been linked to better adherence and viral load outcomes among adolescents. Among adolescents, a significant aspect related to higher adherence to Art treatment highlighted by most studies was the issue of disclosure of one's status for social support (Davies, et al., 2016). Disclosure of one's status has demonstrated to be very protective for viral load suppression and adherence to treatment has enhanced this. There has been a lot of studies conducted that have found an association between nondisclosure and virological failure (Berneimer, et al., 2020). Despite enduring the HIV/AIDS epidemic, stigma still prevails in the current decade which may compromise continuity of care in adolescents hence it is of paramount importance that disclosure be made so that viral load suppression is maintained.

2.3.3.3 Acceptance and its influence on viral load suppression

A study by Mutwa et al. (2013) indicated that acceptance of the HIV status by adolescents lead to better adherence to HIV treatment. The study highlighted that once adolescents accept their status, they developed the will to adhere and live healthy (Mutwa, et al., 2013). In another study it was report that adolescents who are HIV positive and had accepted their status were likely to attend review appointments and would take better care of themselves than those that did not accept their status (Denison, 2015). Such adolescents were likely to develop better self-management skills. The self-management skills includes setting of reminders and learning to keep their own medication (Denison, 2015). Therefore, acceptance of HIV status by adolescents helps them to utilize the reminders such as clocks and to develop the will to adhere to treatment and to manage their own status.

2.3.3.3 Convenience in Scheduled Appointments and its Influence on Viral Load Un-suppression

Adherence to scheduled appointment or clinical visit is a retention measure that is resultant from missed clinical visits. It involves the use of visits scheduled and as well as missed visits or visits attended so as to access one's adherence to ART by most clinicians. A study by Crawford (2012) where he evaluated retention in medical care against its impact on health care outcomes of people living with HIV, categorized visit adherence into three groups which are 0-17%, 80-99% and 100%. Individuals with no show visits were only 20% and 63% achieved viral load suppression in a median of 308 days from their entry in care. Therefor the study results call for discussion between people living with HIV and clinicians to come with an agreement on the dates which clients will not defaults and hence leading to improved outcomes on treatment.

2.3.4 Knowledge Related Factors and their Influence on Viral Load Suppression

In a cohort study carried out in China by Qu et al., (2018) it was noted that there was no significant correlation between adherence to ART in adolescents and information, motivation and behaviour skills. This was in contrast to Pacífico de Carvalho, Mendicino, Cândido, Alecrim, and Menezes de Pádua (2019) who noted that low to moderate knowledge about ART in adolescents has been reported in many studies and associated with non-adherence in a narrative of ART studies. A cross sectional study carried out in China by Poon et al., (2019) showed that adolescents that demonstrated greater HIV knowledge through having been tested or having greater decision-making involvement in condom use had higher medication adherence and therefore resulted in viral load suppression.

The main cited objective reasons for non-adherence in adolescents were forgetting to take medicine (70%), pressure of school and work (29%), fear of side effects (28%) and 'too much trouble' (19%) by Cowan et al., (2016). This is similar to findings by Qu et al., (2018) among adolescents in China, where 'forgetting to take medicine' (70.21%), 'too busy' (29.08%), 'worrying about side effects' (28.01%), and 'too much trouble' (18.44%). In further concurrence is Liu et al., (2014) reported common adherence barriers included forgetting to take the medication (45%), experiencing a change in daily routine (24%), being busy (23%), away from home (19%), or too tired (10%), medication cost (8%), trouble refilling medications (7%), not wanting to take the medication (6%), and being depressed, overwhelmed, or angry (6%).

In a systematic review on ART adherence Muchomba et al., (2012) reported low medication adherence was related to 'forgetting medication' and 'worried about potential side effects. In a study carried out in Kenya on adolescents' knowledge levels and medication adherence, the common causes of low medication adherence were 'away from home' (12%) and 'forgot to take drug' (8%) (Mutua, Sanders, Mugo, Anzala, Haberer, Bangsberg, & Fast, 2012).

2.3.5 Health System Related Factors and their Influence on Viral Load Suppression

Health service factors play a pivotal in the outcome of VL suppression in adolescents. Arpadi et al., 2017, found out that the availability of VL monitoring helps in early interventions like enhanced adherence counselling or switching to another regimen timeously thereby promoting suppression of the virus. The same study also echoed the need for a friendly environment that carters for the needs of both the adolescents and their caregivers. Infrastructural factors like lack of transport and geographical barriers to health

facilities have been shown to be associated with sub-optimal VL suppression. Living within a 10 km radius from a health facility was shown to be independently associated with good adherence (aOR = 2.3, CI = 1.9 – 4.6) in a study that was conducted in Ethiopia. This however, was contrary to findings by Marteli et al., 2019 in Tanzania, where children who lived closer to the health facility had sub-optimal VL suppression rates (OR = 5.6, CI = 1.1 – 26.1). These findings in Tanzania were attributed to stigma and discrimination associated with HIV.

Sources of non-adherence resulting in viral load un-suppression in adolescents vary. Fragmented health systems is one example of the causes of non-adherence, requiring adolescents to attend different clinics from adults (Chhim, et al., 2018). Major hindrance on the uptake of ARVs in adolescents is shortage of specialized trained nurses (Berneimer, et al., 2020). This was emphasized in a study conducted in Malawi where there was lack of specialized trained personnel for counselling and testing which led to limited counselling of the adolescent (Chhim, et al., 2018). Lack of skilled personnel leads to a very high patient volume, long patient waiting-times, brief and poor counselling sessions as well as record keeping (Evans, 2015). Adequate counselling provided to adolescents influence uptake of ART services including adherence to ARVs resulting in viral load suppression (Davies, et al., 2016). These barriers to health services, negatively impact on timely testing, swift return of the test results, and urgent intervention activities to an elevated viral load un-suppression (Haberer, et al., 2015). Adolescents who have had an encounter of negative staff attitudes were also cited as one of the reasons for not coming back to the health facilities. Negative treatment during service delivery by staff at the clinic was mentioned to be one of the factors that can contribute to non-adherence among adolescents (Davies, et al., 2016). In another

study conducted in Uganda where an adolescent who had disengaged in HIV-care during were followed, one adolescent stated that he never returned to the health facility after the nurse provider yelled his name stringently along the courtyard after completing with him so that whoever was within their ears length heard about his status (Chhim, et al., 2018). Discriminating attitude and lack of confidentiality from some health care providers may cause drop out in health care services and without Art treatment, adolescents cannot be suppressed.

2.3.6 Adolescents overall satisfaction and its influence on VL suppression

According to the WHO guidelines, adolescents are currently accessing HIV health care services through several service delivery points, which including the adults HIV clinics, have not yet implemented/initiated specialized care clinics or spaces to provide adolescent with specific services they need. Therefore, these adolescents must gather the confidence to have access health services such as ART treatment with the older counterparts (WHO, 2018).

2.4 Research gaps

A lot of research cited in this particular research study was conducted in countries namely the United States, Cambodia, and South Africa and fewer studies were done in Zimbabwe. Relying on results from other countries may result in under or over-representation of the viral load suppression outcomes on people living with HIV especially among adolescents in Zimbabwe due to the varying in care and treatment settings, interventions and socio-demographic factors. The issues to do with adolescents being left out in the AIDS response still stands out. Very few studies have concentrated on the specific age group of 10-19 years. More attention has been focused on young people 15-24 years and children 0-10 years hence

leaving a gap in the assessment of treatment factors or outcomes that influences suppression of viral load in the category of 10-19 years.

Although there are several studies conducted on factors influencing viral load suppression among adolescents on ART, it is quite evident that the concept of mass viral load testing is fairly new in Africa with the trials among some African countries piloted in 2013. Besides none of these studies was conducted in Western District of Harare, hence leaving a research gap, both theoretically and contextually, which this study aims to address.

2.5 Summary

In this chapter, factors associated with viral load un-suppression that include socio-demographics, client-related, ART regimen-related, HIV/AIDS knowledge levels, availability of anti-retroviral medicines and viral load monitoring services among adolescents living with HIV associated factors have been discussed. Generally, the literature review has pointed out to the need to explore knowledge factors, behavior, attitudes and quality of ART services to adolescent's provision and the need to review practices at different levels by individuals and communities to address deep rooted causes of unsuppressed viral load to other population sub-groups.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter identifies the study methodology, the design and the data collection techniques. It also highlights the proposed sample size and the data analysis plan among other elements.

3.2 The Research Design

The study utilized a 1:1 unmatched case control study design. Given the time and financial limitations to conduct the study a case control study was the most ideal design. The study design included both quantitative and qualitative data collection techniques in addressing study objectives and the research questions. The qualitative design further provided an insight into the reasons, motivations and opinions for some of the behaviors influencing the compliance to the health services including adherence, a factor that greatly influences viral suppression among adolescents. These methods provided a comprehensive understanding of the determinants of viral load un-suppression among adolescents living with HIV.

In this study A case was defined as an adolescent (10-19 years) living with HIV receiving ART care and treatment in the Western District, Harare city, with an un-suppressed VL result in the last 6 months (15 December 2022 to 15 June 2023). A control was defined as an adolescent (10-19 years) living with HIV receiving ART care and treatment in the Western District, Harare city, with a suppressed VL result in the last 6 months (15 December 2022 to 15 June 2023).

3.3 Population and Sampling

3.3.1 Study Setting

The map of Harare Metropolitan Province, Zimbabwe.

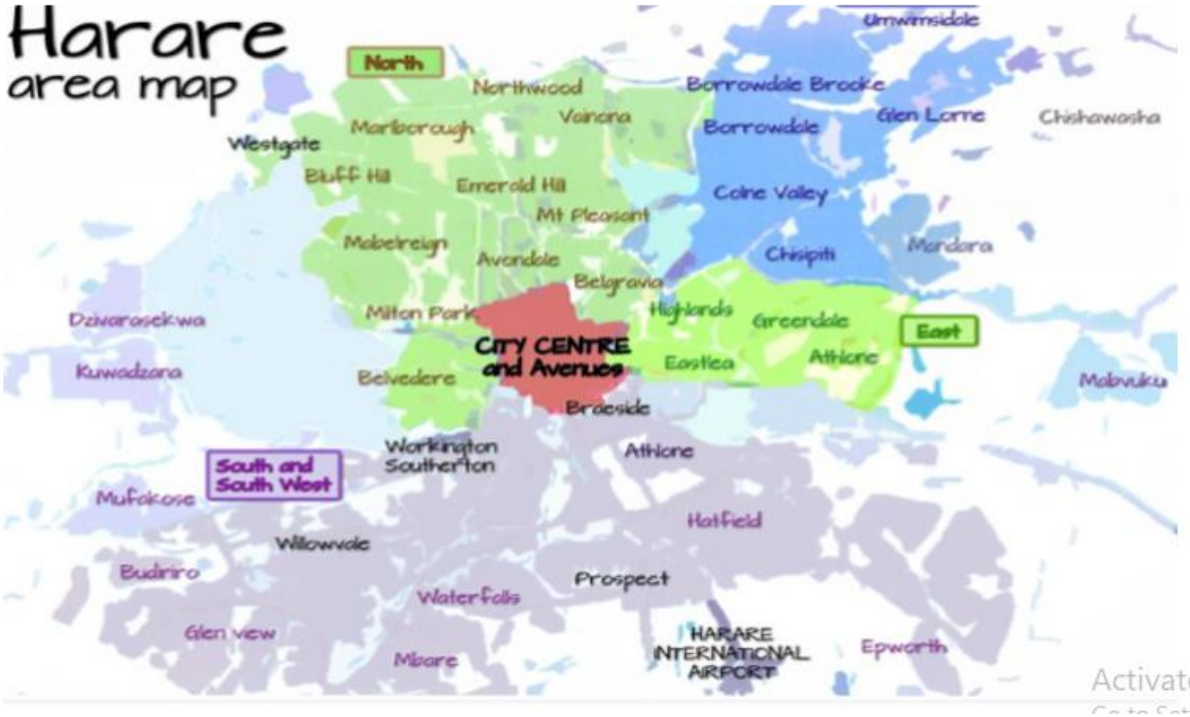

Figure 2: Harare Area Map (Zvanaka et al., 2018)

The study was conducted in the Western District of Harare, at Dzivarasekwa, Kuwadzana, Mufakose, Glenview, and Budiriro council clinics. The district is chosen due to its unique socio-demographic characteristics and the prevalence of HIV among adolescents. The choice of this specific setting allows for a focused investigation into the determinants within a distinct urban context.

3.3.2 Study Population

The study population included all adolescents aged between 10-19 years who were receiving HIV treatment care at Harare Western District clinics. These adolescents mainly included those who had been on ART for at least 6 or more months before the period of study. The

study also considered the responses from caregivers of adolescents and health service providers which include the laboratory scientist, sisters in charge of HIV, and OI focal person working in the Harare Western District.

3.3.3 Inclusion and Exclusion Criteria

3.3.3.1 Inclusion criteria

All clients aged 10-19years with a confirmed HIV diagnosis, who have been on ART for 6 months or more, would have accessed at least one viral load test are eligible to take part in the study and were willing to participate and provide informed consent (and assent for those below 18 years of age).

3.3.3.2 Exclusion criteria

The following were excluded from the study: -

-adolescents with no records of viral load suppression

-adolescents with mental incapacitation and who are not able to respond to the questionnaire

-adolescents that were very sick to respond and those with no written informed consent.

3.3.4 Sample Size Calculation

Using Fleiss formula embedded in Epi Infor version 7, 95% confidence interval, a power of 80%, an adjusted odds ratio of 2.58 based on a study by Davey et.al, 2018, in South Africa where adolescents who started ART at age less than 15 years old were 2.58 times more likely to be un-suppressed compared to those who started after the age of 15 years, and a 5% refusal rate, a sample size of 78 cases, and 78 controls was calculated.

3.3.5 Sampling Procedure

3.3.5.1 Sampling of health facilities

Harare western district has 36 health facilities with only five of these being council health facilities. The five council health facilities were the only ones offering opportunistic infection services. These facilities include Kuwadzana, Glenview, Budiriro, Dzivarasekwa and Mufakose. Proportional sampling was done according to the number of children that received VL tests at each facility from January 2022 to June 2023.

3.3.5.2 Sampling of key informants

-One Zimttech program manager, one laboratory technician and one HIV focal person was purposely sampled according to their speciality, since there was only one of each in the district.

In the district there are 5 SIC and 5 pharmacists for O/I clinics. One SIC and one pharmacist at each of the 5 clinics, Budiriro, Kuwadzana, Glenview, Mufakose and Dzivarasekwa poly clinics. All these carders were purposely sample according to their speciality.

-the district has a total of 25 peer to peer supporters and the dice method approach was used to select the n-th number.

3.3.5.3 Sampling of cases

The OI/ART VL test registers were used to create line lists at each health facility. These line lists were used as the sampling frames. Random sampling of cases was done using computer generated numbers in excel (Table1).

3.3.5.4 Sampling of controls

The OI/ART VL test registers were used to create line lists for controls at each health facility. These line lists were then be used as the sampling frames. Controls of the same

facilities as the cases were randomly selected using computer generated numbers in excel (Table 1).

Table 1: Summary of number of cases and control to be sampled from each health facility, Western district, Harare province

High volume Facility	# of Adolescents receiving OIC services (Cases)	% Cases	# of Adolescents receiving OIC services (Controls)	% Controls	Proportion from Facility (% X 78) Round up Cases	Proportion from Facility (% X 78) Round up Controls
1.Kuwadzana	21	19	89	20	15	16
2.Dzivarasekwa	16	14	79	18	11	14
3.Budiriro	29	26	118	26	20	20
4.Glenview	33	29	123	27	23	21
5.Mufakose	13	12	42	9	9	7
Total	112	100	451	100	78	78

3.4 Data Collection Instruments

Data abstraction instrument - Data abstraction guide was developed in relation to the variables of this study. The abstraction instrument was aligned to the HIV positive client cards. It was used to collect data that had been captured in the routine health care information management records and systems. This instrument was validated before use in the research.

Semi-structured questionnaire - Semi-structured questionnaire which includes both closed and open-ended questions was developed. This questionnaire was pretested and then used to guide, and collect data. The instrument was administered by the research assistants to the study participants, after signing an informed consent.

3.5 Pilot Study

All instruments developed were pretested for accuracy and validity in capturing the required data on adolescents who had attended the HIV clinic on a randomly selected day. Tools were pretested in a similar environment like the Northern District of Harare at Mabvuku clinic to ensure it collected data intended for the study to be conducted.

3.6 Data Collection Procedure

Data was collected on a study population from a single district in time, examining the relationship between viral load un-suppression and possible explanatory factors contributing to this. For this study, the data collection techniques included the following:

Data abstraction from the HIV positive adolescents' files was conducted. Data extraction tool was used to capture the participants' information on gender, age, adherence to treatment, status on viral load suppression, treatment regimen and duration on treatment. A guided questionnaire, face-to-face interview was conducted to collect data on factors influencing viral load suppression which include client related factors and the socio-demographic factors. Both the data abstraction and interviews were conducted with the assistance from the trained research assistants. To explore health care facility related factors contributing to viral load un-suppression, Key Informant interviews were conducted with the health care workers. Interview for key informants had 12 questions.

3.6.1 Sources of Data

3.6.1.1 Primary Sources

Main sources of data for the outcome variables were the viral load register, individual ART cards and electronic medical records (open MRS). For the independent variables, data was collected using the questionnaires and interviews through the interactions with key informants and individual participants. Additional data was extracted from the patient's electronic or paper-based files.

3.6.1.2 Secondary data Sources

The study utilized mainly two sources (Open MRS, viral load register and ART cards) to get data on this variable to address the challenge of incomplete records in some of the data sources.

Quantitative Data:

- **Structured Surveys:** A structured questionnaire will be administered to adolescents to collect quantitative data on socio-demographic factors, adherence to ART, and clinical details.
- **Clinical Records Review:** Relevant clinical records, including viral load measurements, will be obtained from healthcare facilities.

Qualitative Data:

- **In-Depth Interviews:** Semi-structured interviews will be conducted with a subset of participants (n=30) to explore nuanced aspects related to psychosocial factors, healthcare experiences, and personal challenges affecting adherence.

- **Focus Group Discussions (FGDs):** Separate FGDs will be conducted with healthcare providers, caregivers, and community leaders to gather diverse perspectives.

3.6.2 Variables and Measurements

Dependent Variable:

- Viral load suppression status.

Independent Variables:

- Socio-demographic factors (age, gender, socioeconomic status).
- Client-related factors (mental health, social support, disclosure).
- ART regime-related factors (regimen complexity, side effects, treatment duration).

3.6.3 Validity and reliability

The sample size calculation was based on a 5% margin of error and a 95% confidence interval in order to get a sample size large enough, so that the probability of chance, bias, influencing the results is limited. To ensure reliability of the tools, the principal investigator identified research assistants with a health care background who were working at Harare Western District council clinics. These assistants were oriented on the study purpose, HIV care, and the research methodology. The orientation focused on the use of data collection tools and ensuring the research assistants collected accurate, valid, and reliable data.

Standard research tools were utilized by adopting questions in the validated viral load un-suppression in adolescents' questionnaire by Toobert, Hampson & Glasgow (2000).

3.7 Analysis and Organization of Data

Data was analyzed using Epi-Info version 7. The statistical software was used to generate means, frequencies, and proportions, and to perform univariate, bivariate, and multivariate

logistic regression to determine the factors associated with viral load un-suppression among adolescents living with HIV.

3.7.1 Quantitative Data:

- Descriptive statistics were used to summarize socio-demographic characteristics and adherence patterns.
- Inferential statistics (e.g., logistic regression) were employed to assess the associations between independent and dependent variables.

3.7.2 Qualitative Data:

- Thematic analysis was applied to identify recurring themes in interview
- Coding and categorization was performed using qualitative data analysis software.

Factors with p-value of ≤0.25 will be inputted into the logistic model. Key themes and powerful quotes from the key informant interviews were reported.

Table 2: Independent variables for viral load suppression among adolescents in the Western District Harare City, 2023

Variable	**Operationalization**	**Data collection method**
Age	Number of Completed Years	Questionnaire
Sex	Gender (Male or Female)	Observe
Education	Highest Level Attained	Questionnaire
Disclosure Status	Disclosed (yes or no)	Questionnaire, review of records
HIV Drug Adverse Effects	Number of side effects	Questionnaire, review of records
Comorbidity	Presence of other medical conditions	Questionnaire, review of records
WHO staging	WHO stage at ART initiation	Review of records
ART Regimen	1st 2nd or 3rd line treatment	Review of records

3.8 Ethical consideration

Ethical considerations were generated to address any issues that could possibly arise and cover the rights of study participants and the ethical implications. Study permission was sought from the Director of Health for Harare City. For all subjects that were interviewed, we sought written informed assent from the participants aged 16 – 18 years after obtaining consent from their parents and caregivers. Written informed consent was sought from 19-year-old adolescents and caregivers and parents of participants under the age of 18 for enrolment into the research study. The study participants were assigned codes or numbers to ensure confidentiality. Information collected was used only for this study and was kept under lock and key away from any unauthorized persons. Ethical approval was sort from the Africa University Research Ethics Committee (AUREC).

3.8 Dissemination of results

A dissertation report was written at the end of this study and copies of the report was then shared with the Africa University, Harare City and the Western district of Harare. Also feedback meeting with the participants and stakeholders will be conducted.

3.9 Summary

This chapter looked at the research methodology, outlining the research's instruments and how data was collected in the study. Ethical considerations that were observed in this research study were also outlined.

CHAPTER 4 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This research study was conducted in Harare Western District among adolescents (10 – 19 years) and a total of 78 cases and 78 controls participated voluntarily in this study. Chapter four presents' findings from the data collected and which was analyzed using Microsoft excel 2019 and Epi Info version 7.0. The chapter is laid down to provide the study findings based on the study objectives which are:

1) determine the socio-demographic factors associated with viral load un-suppression among adolescents living with HIV in care, Western District Harare City, 2023.
2) ascertain the client-related factors associated with viral load un-suppression among adolescents living with HIV in care, Western District Harare City, 2023.
3) establish the ART regimen-related factors associated with viral load un-suppression among adolescents living with HIV in care, Western District Harare City, 2023.
4) determine the HIV/AIDS knowledge levels among adolescents living with HIV in care, Western District, Harare City, 2023.
5) assess the availability of anti-retroviral medicines, and viral load monitoring services for adolescents living with HIV in care, Western District, Harare City, 2023.

4.2 Participant recruitment

The 1:1 case-control study had a 100% response rate. All the sampled cases and controls consented and agreed to participate in the study.

4.2 Demographic characteristics of the cases and controls

Table 3: Participant's socio-demographic characteristics by viral load suppression status, Western district, Harare, 2023

V**ariable**	Cases N=78 **n (%)**	Controls N=78 **n (%)**	**p-value**
Sex			
Male	33 (42.3)	36 (46.1)	0.747
Female	45 (57.7)	42 (53.9)	
Age Category			
10–14	26 (33.3)	25 (32.0)	0.864
15–19	52 (66.7)	53 (68.0)	
Level of education			
None	2 (2.4)	0 (6.4)	0.036*
Primary	30 (54.0)	32 (50.4)	
Secondary	45 (41.2)	42 (39.2)	
Tertiary	1 (2.4)	4 (4.0)	
Occupation			
School	72 (92.3)	71 (91.0)	0.182
Unemployed	6 (7.7)	4 (5.1)	
Employed	0 (0.0)	3 (3.9)	
Religion			
Orthodox Christian	45 (57.7)	48 (61.5)	0.800
Pentecostal	27 (34.6)	25 (32.1)	
Apostolic	5 (6.4)	3 (3.8)	
Muslim	1 (1.3)	2 (2.6)	
Marital status			
Single	78 (100.0)	76 (97.4)	0.497
Married	0 (0.0)	2 (2.6)	
Biological parents alive			
Yes	27 (34.6)	62 (79.5)	<0.001*
No	51 (65.4)	16 (20.5)	
Age, median (IQR)	14.9 (14.4-16.5)	15.7 (14.8-16.7)	

- means is statistically significant

Table 3 shows the demographic characteristics of cases and controls. Most of the cases 45/78 (57.7%), and controls 42/78 (53.9%) were female. Majority of the study participants 143/156 (92%) were in school. The cases and controls were comparable with only statistically significant differences in the level of education and having biological

parents alive. On level of education, only 2 (two) cases and 0 (none) controls had ever been to school while more than half of the cases (n =30, 54.0%) and slightly more than half of the controls (n = 32, 50.4%) had attained only primary level education. Forty-five of the seventy-eight, (41.2%) of the cases and forty-two (39.2%) of the controls had attained secondary level education whilst only one (1) case and 4(four) controls had gone past secondary school level. The median age for cases and controls in years was 14.9 (14.4-16.5), and 15.7 (14.8-16.7) respectively.

4.3 Knowledge levels

Table 4: Summary of the knowledge levels of cases and controls

Category	**Cases N=78 n (%)**	**Controls N=78 n (%)**	**p-value**
Poor	15 (19.2)	9 (11.5)	0.18
Good	32 (41.0	20 (25.6)	
Excellent	31 (39.8)	49 (62.9)	

Table 4 above summarizes the knowledge levels of the cases and controls. The knowledge levels of the cases and controls were comparable. There was no statistically significant difference in knowledge levels between cases and controls (p=0.18).

4.4 Bivariate analysis

4.4.1 Socio-demographic factors

Table 5 below shows the results of the bivariate analysis of the socio-demographic factors. The only statistically significant factor was having at least one biological parent alive. The odds ratio for not being virally suppressed was 0.14 (0.07 – 0.28) for those who had at least one biological parent alive compared to those that did not. Those who had at least one biological parent alive, where 86% less likely to be virally suppressed compared to those who did not.

Table 5: Bivariate analysis of socio-demographic factors associated with HIV viral load un-suppression, Western district, Harare, 2023

Variable	Cases N=78 n (%)	Controls N=78 n (%)	Odds Ratio (95% CI)	p-value
Sex				
Male	33 (42.3)	36 (46.1)	0.86 (0.45-	0.747
Female	45 (57.7)	42 (53.9)	1.61)	
Age Category				
10–14	26 (33.3)	25 (32.0)	1.06 (0.54-	0.864
15–19	52 (66.7)	53 (68.0)	2.07	
Level of education				
Primary and below	32 (41.0)	32 (41.0)	1.00 (0.53-	1.00
Secondary and above	46 (59.0)	42 (59.0)	1.89)	
Occupation				
School	72 (92.3)	71 (91.0)	1.18 (0.38-	0.182
*Not at school	6 (7.7)	7 (5.1)	3.69)	
Religion				
Apostolic	5 (6.4)	3 (3.8)	1.71 (0.39-	0.47
Not apostolic	73 (1.3)	75 (2.6)	7.43)	
Marital status				
Single	78 (100.0)	76 (97.4)	Undefined	0.15
Married	0 (0.0)	2 (2.6)		
Biological parent(s) alive				
Yes	27 (34.6)	62 (79.5)	0.14 (0.07-	<0.01
No	51 (65.4)	16 (20.5)	0.28)	

**Not at school referred to those employed and unemployed.*

4.4 Client-related factors

Table 6: Bivariate analysis of client-related factors associated with HIV viral load un-suppression, Western district, Harare, 2023

Variable	Cases N=78 n (%)	Controls N=78 n (%)	OR(95% CI)	p-value
Stays with mother				
Yes	49 (62.8)	57 (73.1)	0.62 (0.32-1.23)	0.17
No	29 (37.2)	21 (26.9)		
Family uses ≤2 rooms				
Yes	16 (20.5)	10 (12.8)	1.75 (0.74-4.15)	0.20
No	62 (79.5)	68 (87.2)		
Transport costs to facility <$1				
Yes	59 (75.6)	57 (73.1)	1.14 (0.56-2.35	0.71
No	19 (24.4)	21 (26.9)		
Treatment fatigue				
Yes	17 (21.8)	4 (5.1)	5.16 (1.65-16.13	<0.01
No	61 (78.2)	74 (94.9)		
No disclosure to partner				

Yes	9 (11.5)	6 (7.7)	1.57 (0.53-4.63)	0.42
No	69 (88.5)	72 (92.3)		
Poor knowledge levels				
Yes	15 (19.2)	9 (11.5)	1.83 (0.75-4.46)	0.18
No	63 (81.8)	69 (88.5)		
Attended in same clinic space with adults				
Yes	27 (34.6)	24 (30.8)	1.19 (0.61-2.33)	0.61
No	51 (65.4)	54 (69.2)		
Comfortable with appointment dates				
Yes	56 (71.8)	74 (94.9)	0.14 (0.04-0.42)	<0.01
No	22 (28.2)	4 (5.1)		
Satisfied with the services received at the clinic				
Yes	65 (83.3)	78 (100)	Undefined	<0.01
No	13 (16.7)	0 (0)		
In an adolescent club				
Yes	3 (3.9)	17 (21.8)	0.14 (0.04-0.51)	<0.01
No	75 (96.1)	61 (78.2)		

Table 6 shows the results of bivariate analysis of the client-related factors. The only statistically significant factor was having reported treatment fatigue, being comfortable with the appointment dates, and being in a club. The odds ratio for not being virally suppressed was 5.16 (1.65 – 16.13) for those who reported treatment fatigue compared to those who did not. Those who reported treatment fatigue, where 5.16 times more likely to be virally un-suppressed compared to those who did not. The odds ratio for those who reported being comfortable with the appointment dates and being virally un-suppressed was 0.14 (0.04 – 0.42). Those who reported being comfortable with the appointment dates were 86% less likely to be virally un-suppressed compared to those that did not. The odds ratio for being in a club and being virally un-suppressed was 0.14 (0.04 – 0.51). Those who were in a club were 86% less likely to be virally un-suppressed compared to those that were not.

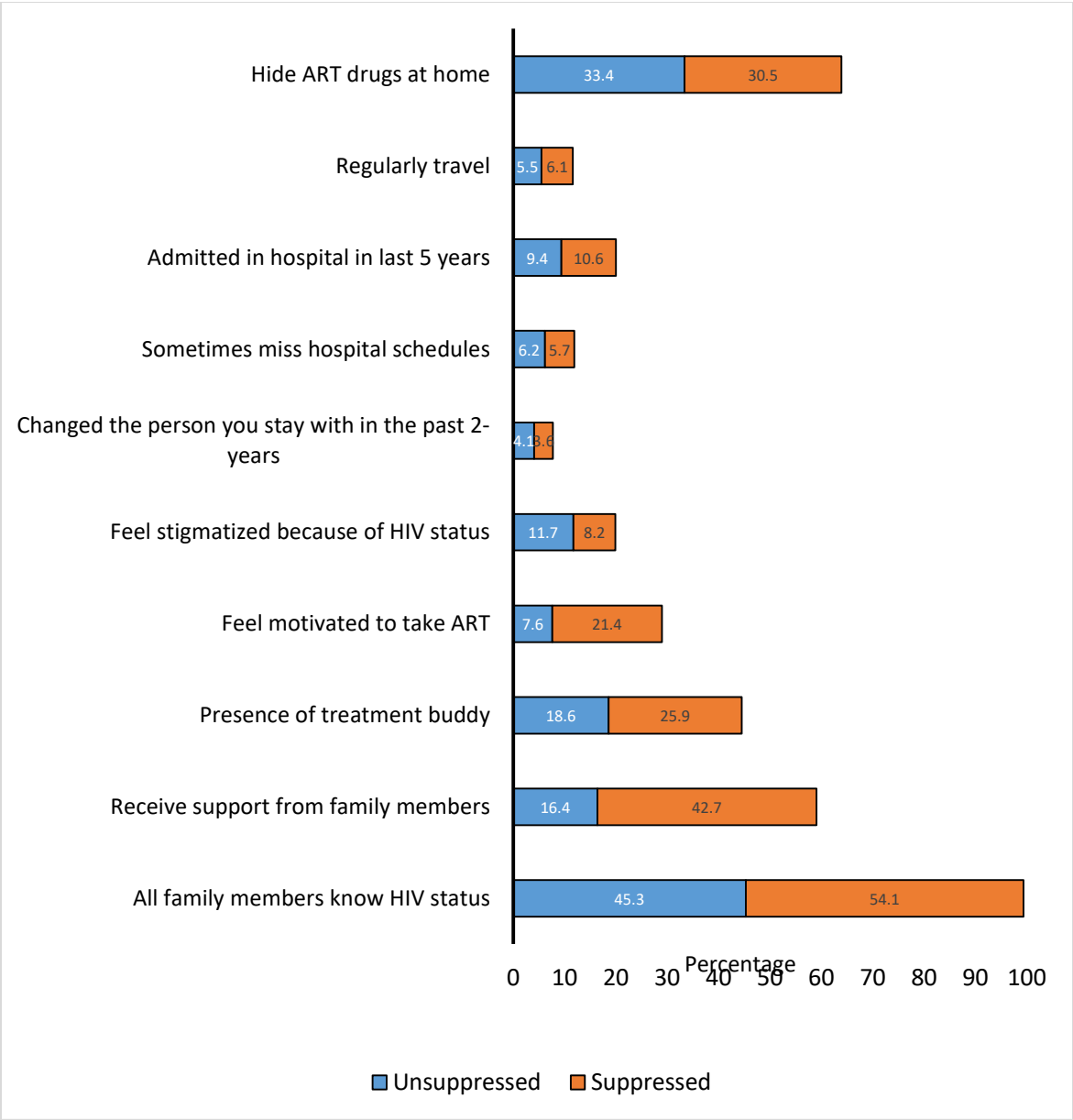

Figure 4.1: Participant's experiences by viral load suppression status

In addition, more client related factors are presented in Figure 4.1 and they show that, more participants who hide their drugs at home are more likely to be virally unsuppressed (33.4% vs 30.5%). Likewise, those who mentioned feeling stigma (11.7% vs 8.2%) were likely unsuppressed. On the other hand, participants who: felt motivated to take ART (21.4% vs 7.6%), had a treatment buddy (25.9% vs 18.6%), receive support from family members

(42.7% vs 16.4%), had family members with knowledge of their HIV status (54.1% vs 45.3%) were all likely to be virally suppressed (Figure 4.1).

4.5 Anti-retroviral therapy regimen related factors

Table 7: Bivariate analysis of ART regimen related factors associated with HIV viral load un-suppression, Western district, Harare, 2023

Variable	Cases N=78 n (%)	Controls N=78 n (%)	Odds Ratio (95% CI)	p-value
On first line ART regimen				
Yes	44 (56.4)	59 (75.6)	0.42 (0.21 – 0.83)	0.01
No	34 (43.6)	19 (24.4)		
Takes ART once a day				
Yes	63 (80.8)	74 (94.9)	0.23 (0.07 – 0.72)	<0.01
No	15 (19.2)	4 (5.1)		

Table 7 above summarizes results for the bivariate analysis for the ART regimen related factors. Those on first line ART regimen had an odds ratio of 0.42 (0.21 – 0.83), and those who took ART once a day had an odds ratio of 0.23 (0.07 – 0.72). Those who were on a first line ART regimen were 58% less likely to be virally un-suppressed compared to those who were not, while those who take ART once a day were 77% less likely to be virally un-suppressed compared to those who were not.

4.6 Multi-Variate analysis

4.6.1 Logistic regression to determine factors independently associated with viral un-suppression.

Table 8: Multiple logistic regression for the association between socio-demographic, client-related and ART regimen related factors associated with viral un-suppression

Factors	Cases N=78 n (%)	Controls N=78 n (%)	Bivariate OR [95% CI]	Multivariate AOR [95% CI]	Odds Ratio
In school					
Yes	72 (92.3)	71 (91.0)	1.18 (0.38-3.69)	1.33 (0.65 – 4.6)	0.29
No	6 (7.7)	7 (5.1)			

Biological parent(s) alive					
Yes	27 (34.6)	62 (79.5)	*0.14 (0.07-0.28)	0.55 (0.43 – 1.15)	0.06
No	51 (65.4)	16 (20.5)			
Stays with mother					
Yes	49 (62.8)	57 (73.1)	0.62 (0.32-1.23)	0.54 (0.46 – 1.17)	0.19
No	29 (37.2)	21 (26.9)			
Family uses ≤2 rooms					
Yes	16 (20.5)	10 (12.8)	1.75 (0.74-4.15)	2.30 (0.85 – 3.93)	0.12
No	62 (79.5)	68 (87.2)			
Treatment fatigue					
Yes	17 (21.8)	4 (5.1)	*5.16 (1.65-16.13	**4.84 (2.01 – 13.90)	0.02
No	61 (78.2)	74 (94.9)			
Poor knowledge levels					
Yes	15 (19.2)	9 (11.5)	1.83 (0.75-4.46)	1.44 (0.83 – 5.39)	0.22
No	63 (81.8)	69 (88.5)			
Comfortable with appointment dates					
Yes	56 (71.8)	74 (94.9)	*0.14 (0.04-0.42)	0.10 (-0.20 – 0.55)	0.06
No	22 (28.2)	4 (5.1)			
In an adolescent club					
Yes	3 (3.9)	17 (21.8)	*0.14 (0.04-0.51)	**0.24 (0.11 – 0.67)	0.01
No	75 (96.1)	61 (78.2)			
On first line ART regimen	44 (56.4)	59 (75.6)	*0.42 (0.21 –	**0.63 (0.49 – 0.90)	0.03
Yes	34 (43.6)	19 (24.4)	0.83)		
No					
Takes ART once a day					
Yes	63 (80.8)	74 (94.9)	*0.23 (0.07 –	**0.15 (0.06 – 0.79)	0.01
No	15 (19.2)	4 (5.1)	0.72)		

*Statistically significant, p-value <0.05; OR: Odds Ratio; AOR: Adjusted Odds Ratio, 95% CI: 95% Confidence Interval, *statistically significant factors on bivariate analysis, **independently significant factors on multivariate analysis.*

Table 8 above summarizes the results of the multivariate logistic regression to determine factors independently associated with viral un-suppression. The only independent factor associated with viral suppression was having reported treatment fatigue 4.84 (2.01 – 13.90) and p-value 0.02. Those who reported experiencing treatment fatigue were 4.84 times more likely to be virally unsuppressed compared to those that did not.

The protective factors were; being in an adolescent club [0.24; 95% CI (0.11 – 0.67)], being on first line ART [0.63; 95% CI (0.49 – 0.90)], and taking ART once a day [0.23; 95% CI (0.07 – 0.72)]. Those who were in an adolescent club were 76% less likely to be virally un-suppressed compared to those that were not in an adolescent club.

4.7 Results for Qualitative data

This section presents qualitative data analysis opinions of the selected health service providers on the ART regimen, client related factors and socio-demographic factors influencing viral load un-suppression, which was gathered through key informant interviews. The different key informants who took part in these interviews included the SIC, Zimttech program manager, laboratory technician, Councilor, HIV focal person and Pharmacist.

One of the key informants emphasized that on the socio-demographic factors, majority of adolescents, almost over 80% of them, have single parents, and with others are not even staying with their guardians regardless that both parents might be alive. This therefor, affects viral load suppression because some of these adolescents do not have supporters who would help remind them to adhere to treatment. Some cases include that of school going children who most likely forget their medications when rushing for classes or school since they will not be having any one to support and remind them. If an adolescent is staying with a family member who take same ART drugs, it is likely that both of them will take their medications and adhere to treatment. However, moving from one caregiver to another may affect the adolescent's viral load suppression especially if the caregiver has never been educated or counseled on the importance of adherence (P. Rungano, personal interview, September 01, 2023).

Tshuma, T. (2023, September 21).Personal interview, actual said, *''Having a single parent affects suppression because some of the adolescents don't have treatment supporters to remind them to adhere. For example, those going to school are most likely to forget their medications when rushing to school since they don't have anyone to remind them. If an adolescent is staying with a family member who take medications, then it's more likely both can take their drugs at the same time. However, moving from one caretaker to another may affect their adherence to medications especially, if the caregiver has never been counseled on the effects of adherence''.*

This finding is however, conquering with this study findings where most of the adolescents did not stay with both parents. The presence a family member taking same ART treatment, and also having both parents as caregivers has an influence on the adolescents' viral load un-suppression. The caregiver or the adolescents' level of education is believed to have an effect on viral load un-suppression and on adherence.

The adolescents or caregivers' level of education is believed to have much effect on viral load suppression and their adherence to treatment. The HIV focal person highlighted that most of the caregivers who are highly educated do not want to be told what to do since they feel they know a lot. In the end they then do things that are contrary to the correct requirements. Those caregivers that are who are illiterate need a lot of effort as they tend to be rigid especially in accepting changes on number of pills. However, constant counselling is vital as this helps the illiterate caregiver in adjusting. Usually, middle class caregivers tend to readily accept advice in case where change is needed. The HIV focal person also highlighted that sometimes in the clinics there might be erroneous in dispensing of the wrong treatment and hence educated adolescents usually pick this up and are corrected

immediately, the cases being different for illiterate adolescents as they tend to report back when they react to the given medications.

The HIV focal person said, *"Most caregivers who are educated think they know a lot and usually do not want to spend time being told what to do. Thus, they end up doing things contrary to what is required. While also those that are illiterate are usually rigid and may need a lot of effort to accept adherence changes especially when it comes to number of pills. However, constant counseling, usually helps them to adjust.''* (A. Zondo, personal interview, September 22, 2023).

According to one of the SIC, age of ART regimen initiation has an effect on the adolescents, viral load un-suppression. Adolescents tend to adhere well to treatment in the start years but as the years progresses, they tend to easily default. However, disclosure is one the major concerns when dealing with adolescents. Adolescents who are not disclosed to early tend to experiment by defaulting and they start asking questions why they should take medication daily. If disclosure is made early to the adolescents, their adherence is usually better.

"Adolescents who start medicines early adhere well in the start years. As they progress, they get tired of the medicines and easily default. But disclosure is one of the major concerns. If adolescents are not disclosed to early, first they start asking why they are taking medicines, try to experiment by not taking and are likely to default. Adolescents who start at a very early age, their adherence is better and they adhere completely if they have been disclosed to.'' (G. Chimudzonga, personal interview, September 25, 2023)

One of the key informants, highlighted that if clinical staff have acquired enough training on delivering services to adolescents, the suppression of viral load tends to be better. All health care carders should be trained on how to handle adolescents for example the pharmacist. In Harare Western District, pharmacists have not been given special training on how to handle different age during the dispensing of drugs. Hence, this leave a gap within the district on conducting on friendly services targeted to adolescents.

"The problem is that only clinicians have been trained in adolescent services enrolled on ART. This leaves a big gap to conduct targeted interventions in adolescent friendly services. For example, pharmacists, have not received any special trainings on how to handle different age groups when it comes to dispensing drugs." (B. Chimutekenza, personal interview, September 25, 2023).

On client related factors, privacy during counseling of adolescent was emphasized as one of the forgotten but actually an important factor that influences adherence and viral load suppression status.

"*I would rate our health facilities here as average. There is limited space for counseling adolescents and as a result minimal privacy on all the services rendered to adolescent as well as to the information shared. However, adolescents' files are kept confidential and only accessible with permission."* (V. Makone, personal interview, September 26, 2023).

During the interview, when asked if the adolescents' appointment system were convenient to serve their needs; one key informant said;

"*There is so much room for discussions if the adolescents give realistic reasons. For example, we discuss with adolescents learning in boarding schools and we fix an agreed*

appointment date with them. For those that are day scholars, and we supply up to 3 months of medicine refills. However, we still experience challenges with poor adherence resulting in viral load un-suppression." (A. Kadenha, personal interview, September 30, 2023).

4.8 Assess the availability of anti-retroviral medicines, and viral load monitoring services for adolescents living with HIV in the Western District, Harare, 2023.

Table 9: Assessing availability of medicines

Medicines	**Health facilities (n=5)**
ABC – 3TC	**5**
Pediatric DTG	**5**
Boosted lopinavier	**5**

Generally, medicines were available at all the 5 health facilities as shown in table 9 above. However, boosted lopinavir was understocked in 2 of the health facilities visited, Kuwadzana and Budiriro.

Table 10: Assessing viral load monitoring

Viral load commodity supply	Health facilities (n=5)
Viral load sample collection tubes	5
Viral load register	5
Sample Courier System	5

Table 10 above shows that viral load monitoring is available at all the 5 facilities and samples were carried to the laboratories using the integrated transport system.

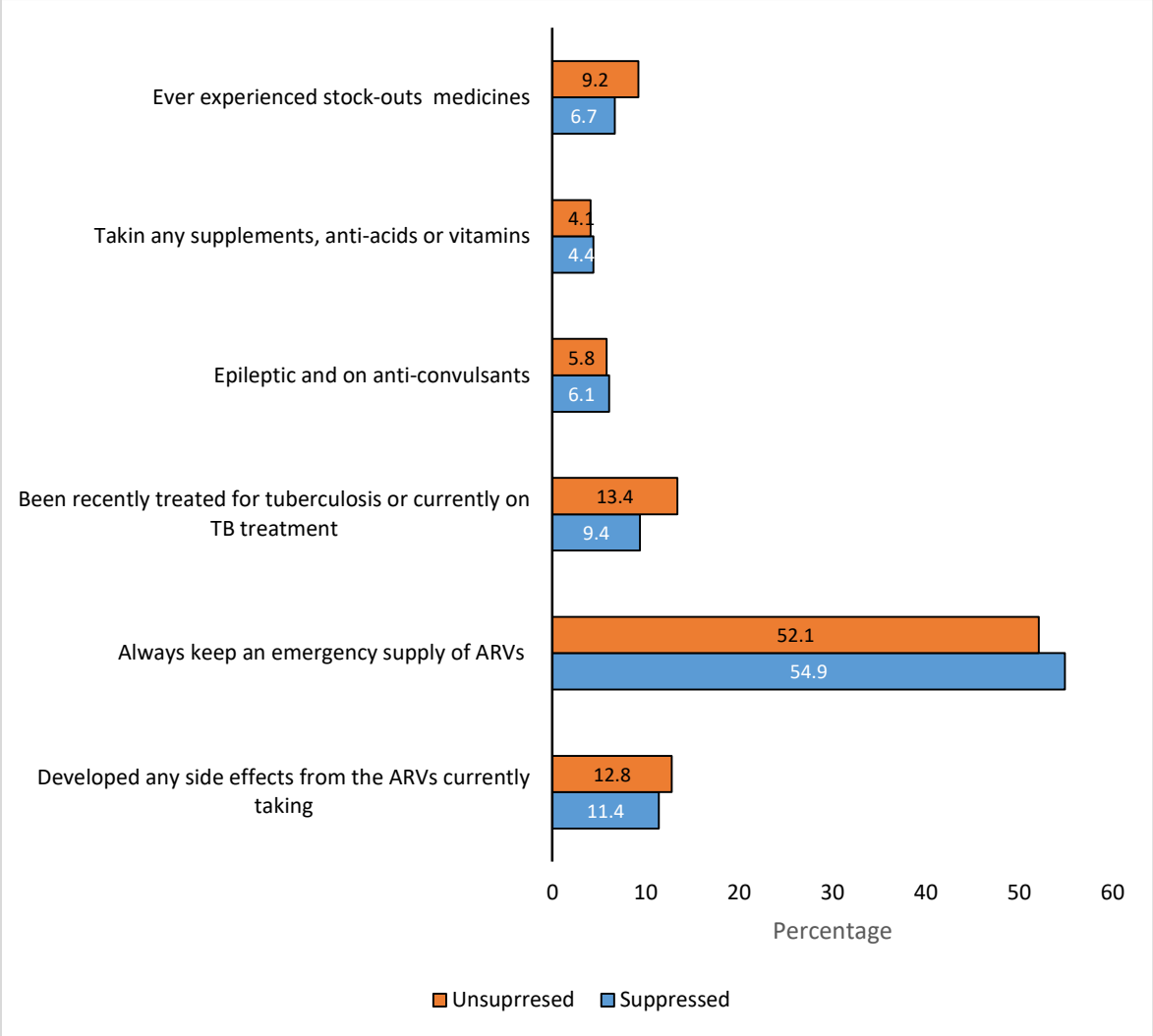

Figure 4.2: *Participant's experiences with ART regimen accessibility and side effects by viral load suppression status*

In addition, we also identified that, respondents who highlighted experiencing stock-outs were likely to unsuppressed (9.2% vs 6.7%). Likewise, more participants were likely unsuppressed if they had been recently treated for tuberculosis (13.4% vs 9.4%) and had recent ART side effect (12.8% vs 11.4%). Nonetheless, those who indicated always keeping an emergency backup of ART were likely suppressed (54.9% vs 52.1%) though in general the majority (53.5%) highlighted keeping an emergency supply (Figure 4.2).

4.9 Summary

In summary, study results revealed that treatment fatigue was an independent factor leading to viral un-suppression among adolescents in Harare Western District and the protective factors were being in an adolescent club, being on first line treatment and taking Art once a day.

CHAPTER 5 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This discussion delves into the findings of a study conducted in 2023, aimed at uncovering the determinants of viral load un-suppression among adolescents living with HIV in the Western District of Harare City. These results are integral to the evolving landscape of HIV care and management for this unique population. The study unveiled associations among socio-demographic, client-related, and ART regimen-related factors, underlining the significance of HIV knowledge, and protective measures in achieving viral load suppression

5.2 Discussion

The discussion section of this study explores the findings in the context of existing literature, identifies key determinants of viral load un-suppression among adolescents living with HIV in the Western District of Harare City in 2023, and discusses implications for clinical practice, policy, and future research.

1. Identification of Determinants:
    - The study identified several determinants of viral load un-suppression among adolescents living with HIV in care, including socio-demographic factors (e.g., age, sex, educational status, poverty), client-related factors (e.g., adherence to ART, disclosure of HIV status, mental health), healthcare-related factors (e.g., access to healthcare services, routine viral load testing), and ART regime-related factors (e.g., duration on current regimen, change of regimen).
2. Complex Interplay of Factors:

- The findings suggest a complex interplay of factors contributing to viral load un-suppression among adolescents. Socio-demographic factors such as poverty and educational status may intersect with client-related factors like mental health and adherence to ART, influencing healthcare-seeking behaviours and treatment outcomes. Additionally, healthcare-related factors such as routine viral load testing and access to healthcare services play a crucial role in monitoring and managing viral load suppression.

3. Importance of Routine Viral Load Testing:
    - Routine viral load testing emerged as a critical factor in promoting viral load suppression among adolescents living with HIV. Access to regular viral load monitoring facilitates early detection of treatment failure, guides treatment decision-making, enhances adherence counselling, and monitors treatment response over time. Ensuring access to routine viral load testing is essential for improving health outcomes and reducing the risk of viral load un-suppression.
4. Implications for Clinical Practice:
    - Clinicians and healthcare providers should prioritize routine viral load monitoring as part of comprehensive HIV care for adolescents. Tailored interventions addressing socio-demographic, client-related, and healthcare-related factors should be implemented to support adolescents in achieving and maintaining viral load suppression. This may include adherence support programs, mental health services, and targeted interventions addressing social determinants of health.
5. Policy Implications:

- Policymakers and healthcare authorities should prioritize investments in HIV care infrastructure, including expanding access to routine viral load testing and strengthening healthcare systems to address the multifaceted needs of adolescents living with HIV. Policy initiatives promoting adolescent-friendly healthcare services, education, and social support programs can contribute to improved viral load suppression outcomes.

6. Future Research Directions:
    - Future research should focus on longitudinal studies to better understand the long-term impact of determinants on viral load suppression among adolescents living with HIV. Additionally, qualitative research exploring adolescents' perspectives and experiences regarding HIV care, treatment adherence, and viral load monitoring can provide valuable insights for developing tailored interventions.

In conclusion, addressing determinants of viral load un-suppression among adolescents living with HIV in care requires a comprehensive approach that considers socio-demographic, client-related, healthcare-related, and ART regime-related factors. By prioritizing routine viral load testing, implementing tailored interventions, and addressing structural barriers to care, healthcare systems can promote optimal health outcomes and improve the quality of life for adolescents living with HIV.

5.2.1 Factors associated with viral load un-suppression

The only independent risk factor for viral load un-suppression in our findings was treatment fatigue. These adolescents have been taking ART medicines for a long time. This finding is plausible as most of these adolescents acquired the HIV infection vertically. Adolescents

with perinatally acquired HIV may have been exposed to mono-therapy for prevention of mother to child transmission, followed by long-term ART and this is very much likely to cause treatment fatigue (Victoria, et al., 2021). Exposure to ART for a longer duration was a common characteristic among adolescents who failed to achieve viral suppression. This finding is consistent with that reported in studies conducted in Northwest Ethiopia (Baya, et al., 2017) and Swaziland (Haberer, et al., 2015). However, the findings in this study are in contrast to a study done in South African, which reported that adolescents who had been on ART between 6 and 12 months were more likely to have viral non-suppression compared with those who had been on treatment longer (Joseph, Abrahams, & Feinberg, 2018).

5.2.2 Protective Factors against viral load un-suppression

The protective factors were being in an adolescent club, being on first line, and taking ART once a day. This study, it was revealed that a substantial proportion (81.5%) of adolescents who had were virally suppressed belonged to an adolescent club. This study finding concur with results of a study conducted in Zambia which found out that adolescents who belonged to an adolescent club had better viral suppression outcomes than those who did not (Evans, 2015) More so, this Zambian study also revealed that viral suppression was associated with belonging to a support group. This is because adolescents' clubs have been identified as successful methods for improving health services uptake by adolescents by facilitating ART adherence. Being in an adolescents' club means that adolescents are kept in care by using social workers and peer supporters who provide them with psychosocial support so as to improve adherence to ART resulting in viral suppression.

The results of this study show that adolescents who were on First line ART were more than one times more likely to have their viral load suppressed. This study's findings agree with

those of a study conducted in Zimbabwe which found that those who are on first line treatment achieved viral suppression unlike those on second line treatment (Nicole, et al., 2021). Studies have demonstrated that being on first line ART is an important predictor of viral suppression among adolescents (Ramadhani, et al., 2014) Barriers to adherence should be addressed in patients with suboptimal adherence before switching to second line therapy to improve their outcome. This study did not evaluate timeliness in switching to effective ART regimens after failure though the timeliness in switching to effective ART regimens after failure may affect viral suppression. Adolescents with delayed switching from a failing ART regimen to an effective one, experience virological failure and are at an increased risk of accumulating drug resistance and mutations (Ramadhani, et al., 2014).

Finding from this study have shown that taking a single pill a day improves adherence and the findings could be attributed to better ART regimens with high treatment tolerability and efficacy. This is in consistency with a study conducted in Uganda which found out that fixed drug combination improves adherence in most adolescents on ART (Chhim, et al., 2018).

5.2.3 HIV/AIDS knowledge levels

Both the cases and the controls had very good HIV/AIDS knowledge. Most participants had a strong understanding of viral suppression, viral load test frequency, and reasons for unsuppressed viral loads. This finding is plausible as these adolescents have been exposed to the health facility a lot of times by virtue of having a chronic condition they are being managed for. This would afford them with plenty of opportunities to be educated on HIV/AIDS including viral load monitoring. This high level of knowledge may contribute to better self-management and adherence, in line with findings in the literature (Murphy et al., 2015). This finding is consistent to a study done in South Africa which found a statistically

significant association between having high knowledge and viral suppression among HIV positive adolescents (Berneimer, et al., 2020) Additionally, in Zimbabwe, having high knowledge levels increased the odds of viral suppression (Sithole, et al., 2018)and in Nigeria high knowledge predicted a better viral suppression as a result of good adherence (Ugwu, 2016).

5.3 Implications

First, the research was limited to the Western District of Harare City, which may restrict the generalizability of the findings. Additionally, some variables relied on self-reporting, potentially introducing recall bias, it was a case control study. Furthermore, we also feel that future research targeting the role of healthcare in trying to improve and enhance viral load suppression among children and adolescents in Zimbabwe.

5.4 Conclusion

In conclusion, the determinants of viral load un-suppression among adolescents living with HIV in care in the Western District of Harare City in 2023 are multifaceted and encompass socio-demographic, clinical, behavioral, and healthcare-related factors. Through a comprehensive examination of these determinants, several key conclusions can be drawn:

1. **Complex Interplay of Factors:** Viral load un-suppression is influenced by a complex interplay of factors, including poor adherence to ART, lack of disclosure of HIV status, mental health challenges, limited access to healthcare services, substance use, treatment regimen issues, and social determinants of health. These factors interact in complex ways, contributing to disparities in viral load suppression outcomes among adolescents living with HIV.

2. **Importance of Routine Viral Load Testing:** Routine viral load testing emerged as a critical component of HIV care management, facilitating early detection of treatment failure, guiding treatment decisions, enhancing adherence counseling, and monitoring treatment response over time. Ensuring access to routine viral load testing is essential for improving viral load suppression outcomes among adolescents.
3. **Need for Tailored Interventions:** Addressing determinants of viral load un-suppression requires tailored interventions that target the specific needs and challenges faced by adolescents living with HIV. These interventions should be multidimensional, addressing socio-demographic, clinical, behavioral, and healthcare-related factors through a combination of clinical care, psychosocial support, adherence counseling, and community-based services.
4. **Role of Social Determinants:** Social determinants of health, such as poverty, education, housing stability, and access to social support networks, significantly impact adolescents' ability to adhere to ART and engage in HIV care. Addressing social determinants of health is essential for addressing disparities in viral load suppression outcomes and promoting health equity among adolescents living with HIV.
5. **Collaborative Approach:** Addressing viral load un-suppression among adolescents living with HIV requires a collaborative approach involving healthcare providers, policymakers, community organizations, caregivers, and adolescents themselves. By working together to address the underlying determinants of viral load un-suppression, stakeholders can improve health outcomes and quality of life for adolescents living with HIV in the Western District of Harare City.

In summary, addressing determinants of viral load un-suppression among adolescents living with HIV in care requires a comprehensive, multidisciplinary approach that considers the complex interplay of socio-demographic, clinical, behavioral, and healthcare-related factors. By prioritizing routine viral load testing, implementing tailored interventions, addressing social determinants of health, and fostering collaboration among stakeholders, meaningful progress can be made in improving viral load suppression outcomes and reducing the burden of HIV among adolescents in Harare City.

This study offers valuable insights into the multifaceted determinants of viral load un-suppression among adolescents living with HIV in the Western District of Harare City. The findings highlight the importance of a holistic, patient-centered approach to HIV care and management.

To enhance viral load suppression among adolescents living with HIV, healthcare systems and policymakers must consider the unique needs of this population. Interventions should focus on how to mitigate against treatment fatigue using friendlier regimens, scaling up differentiated service delivery models like the adolescents clubs, and the use of fixed dose combinations to reduce the pill burden for the adolescents. These findings provide a basis for tailored interventions that can ultimately improve the health outcomes of adolescents living with HIV.

While the study has shed light on several significant factors, further research is needed to explore the impact of broader socio-economic factors, healthcare infrastructure, and peer support on viral load suppression. Such research can advance our understanding of the intricacies of HIV care among adolescents and inform more effective interventions.

5.5 Recommendations

Based on the findings and conclusions drawn from the study on determinants of viral load un-suppression among adolescents living with HIV in care in the Western District of Harare City in 2023, the following recommendations are proposed:

1. **Enhance Access to Comprehensive HIV Care Services:**
    - Increase accessibility and availability of comprehensive HIV care services, including routine viral load testing, ART medications, mental health support, adherence counselling, and social services, to ensure that adolescents have access to the resources they need to achieve and maintain viral load suppression.
2. **Implement Adolescent-Friendly Healthcare Approaches:**
    - Develop and implement adolescent-friendly healthcare approaches that are tailored to the unique needs and preferences of adolescents living with HIV. These approaches should prioritize confidentiality, privacy, non-judgmental care, and age-appropriate communication to promote engagement in HIV care.
3. **Strengthen Adherence Support Programs:**
    - Strengthen adherence support programs that provide education, counselling, and psychosocial support to adolescents living with HIV. These programs should address barriers to adherence, such as stigma, fear of disclosure, medication side effects, and competing priorities, and empower adolescents to take an active role in managing their HIV treatment.
4. **Promote Routine Viral Load Monitoring:**

- Promote routine viral load monitoring as a standard of care for adolescents living with HIV. Ensure that healthcare facilities have the capacity to conduct regular viral load testing and provide timely feedback to adolescents and their caregivers to monitor treatment response and detect early signs of treatment failure.

5. **Address Social Determinants of Health:**
    - Address social determinants of health, such as poverty, education, housing instability, and access to social support networks, that impact adolescents' ability to adhere to ART and engage in HIV care. Implement interventions that address structural barriers to care and promote health equity among adolescents living with HIV.
6. **Facilitate Transition to Adult Care:**
    - Facilitate smooth transitions from paediatric to adult HIV care services for adolescents as they transition into adulthood. Provide support and guidance to adolescents during this transition period to ensure continuity of care and minimize disruptions in treatment adherence and viral load suppression.
7. **Foster Collaboration and partnership**
    - Foster collaboration and partnership among healthcare providers, policymakers, community organizations, caregivers, and adolescents themselves to address the complex challenges associated with viral load un-suppression among adolescents living with HIV. By working together, stakeholders can leverage their collective expertise and resources to improve health outcomes for adolescents living with HIV in the Western District of Harare City.

Recommendations for Healthcare Practices

Strengthening Adherence Support:

- Implement targeted interventions to enhance adherence support for adolescents receiving antiretroviral therapy (ART). This could include the development of reminder systems, peer support programs, and family involvement.

Integrated Mental Health Services:

- Integrate mental health services into routine HIV care to address psychosocial factors influencing viral load outcomes. Train healthcare providers to recognize and address mental health challenges among adolescent patients.

Youth-Friendly Healthcare Services:

- Establish and promote youth-friendly healthcare services that cater to the unique needs of adolescents. This may involve creating comfortable spaces, ensuring confidentiality, and providing age-appropriate information.

Policy Recommendations

Education and Awareness Campaigns:

- Advocate for educational programs to raise awareness about the importance of adherence to ART among adolescents, caregivers, and community members. Tailor campaigns to address stigma and misconceptions surrounding HIV.
- Policy makers need working with the adolescents to review and revise the HIV/AIDS information that is being given to adolescents to ensure that it addresses viral load un-suppression.

Socioeconomic Support:

- Advocate for policies that address the socioeconomic challenges faced by adolescents living with HIV. This could include targeted support for families with limited resources and initiatives to improve overall community well-being.

Recommendations for Community Engagement

Community-Based Support Groups:

- Establish community-based support groups for adolescents living with HIV, where they can share experiences, receive guidance, and build a sense of community. Involve community leaders and organizations in supporting these initiatives.

School-Based Interventions:

- Collaborate with educational institutions to implement school-based interventions that focus on HIV awareness, prevention, and destigmatization. Promote a supportive environment for students living with HIV.

Implementation Strategies

- Foster collaboration among healthcare providers, community leaders, policymakers, and non-governmental organizations to implement the recommended interventions. A multi-stakeholder approach ensures a holistic and sustainable impact.

Training and Capacity Building:

- Provide training and capacity-building programs for healthcare professionals to enhance their skills in addressing the unique needs of adolescents living with HIV. This may include training on adolescent-friendly communication and mental health support.
- Program managers should work towards scaling up the enrolment of adolescents in differentiated service delivery models.

- There is need for the national level to consider introducing fixed dose combinations of ART medicines to reduce the pill burden on the adolescents.
- Viral load focal persons need to monitor suppression by age group to understand different needs and challenges that affect suppression among adolescents.

By implementing these recommendations, stakeholders can take proactive steps to address determinants of viral load un-suppression among adolescents living with HIV in care, promote viral load suppression, and improve overall health outcomes for this vulnerable population in Harare City.

5.6 Suggestions for further research

Longitudinal Studies:

- Encourage the conduct of longitudinal studies to track the adherence patterns and viral load outcomes of adolescents over an extended period. This would provide a more comprehensive understanding of the dynamic nature of determinants.

Comparative Studies:

- Facilitate comparative studies between urban and rural settings to explore regional variations in determinants and healthcare delivery. This can contribute to developing context-specific interventions.

5.7 Communication and dissemination

The research results will be communicated and dissemination to the key stakeholders of Harare Western District, and to the Africa University Community through a Brownbag series. The research findings will be disseminated at the Annual Medical Research Day.

Nevertheless, the research results will be sent for publication in an identified journal, as well as being kept in the Africa University Research Database and library.

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APPENDICES

Appendix 1: English Questionnaire for adolescents on ART

Questionnaire number……..
Date…….

1. Name of health facility …….....

Socio-Demographic Data

2. Sex
   1. Male ☐ 2. Female ☐
3. Age (years) ……
4. Do you have both parents?
   1. Yes ☐ 2. No ☐
5. Which family members do you stay with? (Tick all that applies)
   1. Mother ☐ 2. Father ☐ 3. Sister ☐
   4. Brother ☐ 5. Others (specify)……

6. Do all your family members know your status?
   1. Yes ☐ 2. No ☐

7. If yes do they support you?
   1. Yes ☐ 2. No ☐

8. If yes, in what way do they support you?
   1. Feeding ☐ 2. Accommodation ☐ 3. Education ☐
   4. Basic requirements ☐ 5. Others (specify)

9. Is there any family member who take the same medication as you?
   1. Yes ☐ 2. No ☐

10. Have your ever been prayed for or given traditional medicines to deliver or to cure you from the illness (HIV/AIDS)?
    1. Yes ☐ 2. No ☐

11. What is the highest level of education attained?
    1. Never been to school ☐ 2. Primary ☐ 3. Secondary ☐
    4. Ordinary level ☐ 5. Advanced level ☐ 6. Tertiary level ☐

Client-provider factors

12. Have you ever been attended to in the same clinic space with adults?

1. Yes ☐ 2. No ☐

13. Have you ever been attended to with children younger than 10years in the same clinical space?

1. Yes ☐ 2. No ☐

14. Do you agree that your information is kept private and confidential?

1. Strongly agree ☐ 2. I agree ☐ 3. I do not know ☐

4. I disagree ☐ 5. Strongly disagree ☐

15. Are you comfortable with the days when your appointments are being scheduled?

1. Yes ☐ 2. Yes ☐

16. If yes for Q 15, why? .....

17. If no for Q15, why? ……..

18. Overall, do you feel satisfied with the services you are getting at this clinic?

1. Very satisfied ☐ 2. Satisfied ☐ 3. I will not say ☐

4. Unsatisfied ☐ 5. Very unsatisfied ☐

Appendix 2: Shona Questionnaire for adolescents on ART

Questionnaire number …… Date…….

1. Zita renzvimbo yehutano ……..…

Socio-demographic data

2. Sex

1. Murume ☐ 2. Mukadzi ☐

3. Zera (makore)……

4. Une vabereki vase here?

1. Hongu ☐ 2. Kwete ☐

5. Ndeipi nhengo dzemhuri yaunogara nayo? (Tarisa zvese zvinoshanda)

1. Amai ☐ 2. Baba ☐ 3.Hanzvadzi ☐

4. Mkoma ☐ 5. Vamwe vese (specify)……

6. Vese vemhuri yako vanoziva mamiriro ako here?

1. Hongu ☐ 2. Kwete ☐

7. Kana hongu vanokutsigira here?

1. Hongu ☐ 2. Kwete ☐

8. Kana wati hongu, vanokutsigira sei?

1. Kudya ☐ 2. Pekugara ☐ 3. Dzidzo ☐

4. Basic zvinodiwa ☐ 5. Zvimwe (specify)

9. Pane nhengo yemhuri inonwa mushonga wakafanana newe

1. Hongu ☐ 2. Kwete ☐

10. Wakambonamatirwa here kana kupihwa mishonga yechivanhu kuti usununguke kana kukuporesa kubva kuhurwere (HIV/AIDS)?

1. Hongu ☐ 2. Kwete ☐

11. Ndeipi iri mwero wakakwirira zvikuru wedzidzo inowanwa?

1. Kusamboenda kuchikoro ☐ 2. Primary ☐ 3. Secondary ☐

4. Ordinary level ☐ 5. Advanced level ☐ 6. Tertiary level ☐

Mutengi-anopa zvinhu

12. Wakamboenda kukiriniki munzvimbo imwe chete nevakuru here?

1. Hongu ☐ 2. Kwete ☐

13. Wakamboshanyira here vana vari pasi pemakore gumi munzvimbo imwe chete yekiriniki?

1. Hongu ☐ 2. Kwete ☐

14. Iwe unonzwa here kuti ruzivo rwako rwakachengetwa pakavanzika uye zvakavanzika?

1. Bvumirana zvakasimba ☐ 2. Ndobvumirana nazvo ☐ 3.Andizivi ☐

4. Andibvumirani nazvo ☐ 5. Kupokana zvakanyanya ☐

15. Unonzwa wakasununguka here nemazuva apo misiano yako yakarongwa?

1. Hongu ☐ 2. Hongu ☐

16. Kana wati hongu paQ 15, sei?

.....

17. Kana wati kwete paQ15, sei?

……..

18. Pakazara, unonzwa kugutsikana nerubatsiro rwauri kuwana pakiriniki ino?

1. Kugutsikana zvikuru ☐ 2. Ndagutsikana ☐ 3. Andina mashoko ☐

4. Kusagutsikana ☐ 5. Kusagutsikana zvakanyanya ☐

Appendix 3: ART Regimen Related Factors

Checklist tool

This form is completed for HIV positive adolescents that are have been on ART for 6 months or more and had their viral load tests done**.**

Social demographics

1. ART card number ……..
2. Sex
   Male ☐
   Female ☐
3. Age
   (Years) ……...
4. Date of birth
   DD/MM/YYYY
5. Marital status
   1. Married ☐
   2. Never married ☐
   3. Child ☐
   4. Divorced ☐
   5. Widowed ☐

ART regimens

6. Care entry point

1. eMTCT ☐ 2. TB ☐ 3. Outpatient ☐
4. Outreach ☐ 5. Other (specify) ☐

6. Date of first viral load? (DD/MM/YYAYY)…….
7. Results……copies
8. Latest viral load results ……. Copies
   1. Below 1000 copies ☐ 2. 1000 copies and above ☐
9. Suppression status
   1. Suppressed 2. Unsuppressed
10. Date of ART initiation (DD/MM/YYYY) …….
11. Age at initiation (years) …….
12. CD4 at initiation
13. Art regimen at initiation
    1. TDF/3TC/EFV ☐ 2. AZT/3TC/EFV ☐
    3. AZT/3TC/NVP ☐ 4. ABC/3TC/NVP ☐

5. ABC/3TC/EFV ☐ 6. D4T/3TC/NVP ☐

7. D4T/3TC/EFV ☐ 8. DD1/3TC/NVP ☐

9. Other (Specify)……..

15. Failed on treatment?

1. Yes ☐ 2. No ☐

16. If yes for Q15 ART regimen changed to

1. TDF/3TC/LPV/r ☐ 2. AZT/3TC/LPV/r ☐

3. ABC/3TC/LPV/r ☐ 4. Other (Specify)……

17. If yes for Q15 was the adolescent taken through intensive counselling?

1. Yes ☐ 2. No ☐

18. Is there evidence of counselling on the client' file?

1. Yes ☐ 2. No ☐

19. How long had the adolescent spend on the second line regimen? (Specify)…….

20 appointment kept for the past 12months?

Appendix 4: Key Informant Interview Guide

Introduction

Hello, my name is my name is Theresa Toro am are am conducting a study on Viral load un-suppression among adolescents (10-19 years) living with HIV in care. The purpose of this study is to identify the factors that are influencing viral load un-suppression among adolescents in care. The findings of this study will be shared and would add to the body of knowledge and through lessons learnt, recommendations to improve the adolescents would be made. I am therefor, requesting for permission to take your thoughts and views in factors influencing the care of these adolescents. This interview will take approximately 30 minutes. The interview is voluntary, and your responses are confidential and will only be used for the purpose of this study. Anonymity would be maintained. You can refuse to answer any or all the questions. Do you want to know anything else about this study?

Can we start the interview now?

Particulars	Details
Name of Interviewer	Theresa Toro
Designation	
Date	
Sign	

Key informant in depth interview questions

Key informant questionnaire would be given to the sister in charge, the nurses and the community linkage coordinators who are working at O/I clinics in the western district of Harare.

Section A – Socio-demographic characteristics

1. Can you describe the nature of adolescents and their related families attending your clinic?

   _____

   _____

2. Do you think their background affects their adherence and viral load suppression?

   _____

   _____

3. Do you think the religion of the adolescent has an effect on their viral load suppression?

   _____

   _____

4. Does ones' level of education influence their adherence and treatment outcomes of suppressing the virus?

   _____

   _____

Section B – ART regimen related factors

5. Do you think appointments scheduled are convenient to these adolescents? Explain why?

   _____

   _____

6. Are there specific staff trained to handle and deal with adolescents?

   _____

   _____

7. How would you rate private and confidentiality at this clinic? Why do you say so?

   _____

   _____

8. Do you think adolescent attending this clinic are satisfied with your service provision? Why?

   _____

   _____

9. If an adolescent misses an appointment, would they be attended to?

   _____

   _____

10. At this clinic are adolescents and adults attended to at the same clinic space and on the same dates?
    _____
    _____
11. What intervention have you put in place to serve the adolescents better?
    _____
    _____

Section C – ART regimen related factors

12. With regards to viral load suppression, what would you take on the effect of the following?
    a) Type of regimen at initiation. Please explain further?
    _____
    _____
    b) Age at initiation. Please give further explanation?
    _____
    _____
    c) Duration on the treatment regimen. Please explain?
    _____
    _____

Thank you very much for your time and taking part in this discussion.

Appendix 5: English Consent Form for the Caregiver and the Adolescent

Good day Sir/Madam

My name is _____. I am conducting data collection on behalf of Theresa Toro, a student at Africa University.

Study purpose: The study will be looking be looking at viral load un-suppression among adolescents (10-19 years) in Harare Western District. All the gathered information will be used for the purpose of this study and obtained results will be shared with Harare city and Africa University to improve the health outcomes of adolescents served in the Western district. Information collected and your identity will be kept private and confidential. The information will only be used for the purpose of this research study.

Duration: If you allow the child to take part in this study, we will talk to him on one on one. The discussion will take place with trained researchers, in a private location in your community. Prior to the discussion, a member of the research team will administer a brief questionnaire designed to collect non-identifying socio-demographic information about them. They will then be asked questions about specific issues related to factors influencing viral load un-suppression. The one on one interview will take about 20 minutes. However, there is no coercion in taking part in this study, you can choose to opt out of the study at any time.

Do you have any questions before we start the interview?

Risks: Even if you agree to your child's participation, we will only ask them to take part if they want to. The risks of participating in this study are small. Questions asked in this research study are related to HIV positive adolescents, hence, might cause emotional

discomfort, especially if your family or your child have been affected negatively by the disease.

Benefits: There are unlikely to be direct benefits to participants when they take part in this study. However, through participation in the one on one they may become aware of the factors that may cause viral load un-suppression. Information collected from your Childs' contribution will be used to help us determine factors responsible for his/her failure or success in suppressing the HIV virus in their blood. Their information will also inform health providers on the key interventions to take in improving the Childs' overall outcomes on treatment.

Consent: I…… (The signing participant), consent that I have been well informed on the details regarding this study. I have was given a chance to ask questions and they were fully and clearly responded to. I understand the benefits, objectives, and the procedure of this study. I was also given enough time to get a reflection on the information provided and received. I therefore, decide voluntarily to take part in this study. I have been well informed that I may opt out of this study without providing justification or facing any consequences.

I fully understand that for any questions and clarification about this study I can contact the researcher at any given time.

(You are making a decision whether or not your child should participate in this study. Your signatures indicates that you have read and understood the information provided above, have had all your questions answered, and have decided to allow them to participate and they are also willing to participate themselves to).

Participant's signature/thumb print_____ Date:

_____

Care-taker's signature/thumb print _____ Date:

_____

Interviewer's signature _____Date:

_____

Contact person: For any other questions that you may have about this study, please contact the person in charge of the study **Theresa Toro on this number 0777 637 351**

Appendix 6: Sungawirirano

Maswera sei Sir/Madam

Zita rangu ndi _____. Ndiri kuunganidza data ndichimiriririra Theresa Toro, mudzidzi wepa Africa University.

Chinangwa cheChidzidzo: Chidzidzo ichi chichange chiri kutarisa nezvehutachiwana hwekusadzvanya pakati pevachiri kuyaruka (makore gumi kusvika-19) mudunhu reHarare Western District. Ruzivo rwese rwunounganidzwa rwuchashandiswa kuita chidzidzo ichi uye zvabuda zvichagoverwa neguta reHarare neAfrica University kusimudzira hutano hwevechidiki vanogara mudunhu reku Harare Western District. Ruzivo rwakaunganidzwa uye chitupa chako chichachengetwa chakavanzika uye chakavanzika. Ruzivo urwu ruchashandiswa chete nechinangwa cheongororo iyi.

Nguva yatinotora: Kana mukabvumira mwana kutora chikamu muchidzidzo chino, tichataura naye mumwe nemumwe. Hurukuro ichaitika nevaongorori vakadzidziswa, munzvimbo yakavanzika munharaunda yako. Hurukuro isati yatanga, nhengo yeboka retsvakurudzo inozonyora mibvunzo pfupi yakagadzirirwa kuunganidza ruzivo rusingazive nezvemagariro evanhu pamusoro pavo. Vanobva vazobvunzwa mibvunzo pamusoro penyaya dzine chekuita nezvikonzero zvinopesvedzera utachiona hwehutachiwana. Iyo pabvunzurudzo imwe inotora anenge maminitsi makumi maviri. Zvakadaro, hapana kumanikidzwa kutora chikamu muchidzidzo ichi, unogona kusarudza kubuda muchidzidzo chero nguva.

Une mibvunzo here tisati tatanga kubvunzurudza?

Njodzi: Kunyange mukabvuma kutora chikamu kwemwana wenyu, tinongomukumbira kuti atore chikamu kana achida. Ngozi dzekutora chikamu muchidzidzo ichi idiki. Mibvunzo yakabvunzwa mutsvakurudzo iyi.

Vane hukama nevechiri kuyaruka vane HIV, saka, zvinogona kukonzera kusagadzikana mupfungwa, kunyanya kana mhuri yako kana mwana wako akabatwa zvisina kunaka nechirwere ichi.

Mabhenefiti: Panogona kunge pasina mabhenefiti akananga kune vatori vechikamu pavanotora chikamu muchidzidzo ichi. Zvisinei, kuburikidza nekutora chikamu mune imwe pane imwe vanogona kuziva zvinhu zvinogona kukonzera hutachiona hwehutachiwana husina kudzvinyirira. Ruzivo rwunounganidzwa kubva mukubatsira kweVana vako ruchashandiswa kutibatsira kuona zvikonzero zvakakonzera kukundikana kwake kana kubudirira mukudzvinyirira utachiona hweHIV muropa ravo. Ruzivo rwavo ruchazivisawo vatapi vehutano nezvematanho akakosha ekutora mukuvandudza mhedzisiro yeVana pakurapa.

Mvumo: Ini…… (Mutori wechikamu ari kusaina), ndinobvuma kuti ndanyatsoudzwa nezvenyaya yeongororo iyi. Ndakapihwa mukana wekubvunza mibvunzo uye vakapindurwa zvizere uye zvakajeka. Ndinonzwisisa mabhenefiti, zvinangwa, nemafambisirwo echidzidzo chino. Ndakapihwawo nguva yakakwana yekuti ndiwane kufungisisa nezveruzivo rwakapihwa nekutambirwa. Naizvozvo, ndinosarudza nekuzvipira kutora chikamu muchidzidzo ichi. Ndakaziviswa kuti ndinogona kubuda mutsvakurudzo iyi ndisina kupa zvikonzero kana kutarisana nemipimo ipi zvayo. Ndinonzwisisa zvizere kuti kune chero mibvunzo uye kujekeswa nezvechidzidzo ichi ndinogona kubata muongorori chero nguva.

(Uri kuita sarudzo yekuti mwana wako opinda here kana kuti orega muchidzidzo chino. Masaini ako anoratidza kuti waverenga uye wakanzwisisa ruzivo rwapihwa pamusoro, wapindurwa mibvunzo yako yese, uye wasarudza kuvabvumira kuti vatore chikamu uye ivowo varipo. vanoda kutora chikamu pachavo).

Siginicha yemutori wechikamu/chigunwe chechigunwe _____ Zuva:

_____

Siginicha yemunhu anochengeta/chigunwe chechigunwe _____ Zuva:

_____

Siginicha yemubvunzurudzo _____Date: _____

Wekubata: kana muine mubvunza batai .Theresa Toro pa 0777637351

Appendix 7: Adolescent Assent Form [English Version]

Good day Sir/Madam

My name is _____. I am conducting data collection on behalf of Theresa Toro, a student at Africa University.

Study purpose: The study will be looking at viral load un-suppression among adolescents (10-19 years) in Harare Western District. All the gathered information will be used for the purpose of this study and obtained results will be shared with Harare city and Africa University to improve the health outcomes of adolescents served in the Western district. Information collected and your identity will be kept private and confidential. The information will only be used for the purpose of this research study.

Duration: If you take part in this study, we will talk to you on one on one. The discussion will take place with trained researchers, in a private location in your community. Prior to the discussion, a member of the research team will administer a brief questionnaire designed to collect non-identifying socio-demographic information about you. You will then be asked questions about specific issues related to factors influencing viral load un-suppression. The one on one interview will take about 20 minutes. However, there is no coercion in taking part in this study, you can choose to opt out of the study at any time.

Do you have any questions before we start the interview?

Risks: Even if you agree to take participate in study, we will only ask you to take part if you want to. The risks of participating in this study are small. Questions asked in this research study are related to HIV positive adolescents, hence, might cause emotional discomfort, especially if your family or you have been affected negatively by the disease.

Benefits: There are unlikely to be direct benefits to participants when you take part in this study. However, through participation in the one on one, you may become aware of the factors that may cause viral load un-suppression. Your contribution will be used to help us determine factors responsible for your failure or success in suppressing the HIV virus in your blood. This information will also inform health providers on the key interventions to take in improving your overall outcomes on treatment.

Consent: I…… (The signing participant), consent that I have been well informed on the details regarding this study. I was given a chance to ask questions and they were fully and clearly responded to. I understand the benefits, objectives, and the procedure of this study. I was also given enough time to get a reflection on the information provided and received. I therefore, decide voluntarily to take part in this study. I have been well informed that I may opt out of this study without providing justification or facing any consequences.

I fully understand that for any questions and clarification about this study I can contact the researcher at any given time.

Participant's signature/thumb print_____ Date:

_____

Interviewer's signature _____Date:

_____

Contact person: For any other questions that you may have about this study, please contact the person in charge of the study **Theresa Toro on this number 0777 637 351**

Appendix 8: Adolescent Assent Form [Shona Version]:

Sungawirirano

Maswera sei Sir/Madam

Zita rangu ndi _____. Ndiri kuunganidza data ndichimiririra Theresa Toro, mudzidzi wepa Africa University.

Chinangwa cheChidzidzo: Chidzidzo ichi chichange chiri kutarisa nezvehutachiwana hwekusadzvanya pakati pevachiri kuyaruka (makore gumi kusvika-19) mudunhu reHarare Western District. Ruzivo rwese rwunounganidzwa rwuchashandiswa kuita chidzidzo ichi uye zvabuda zvichagoverwa neguta reHarare neAfrica University kusimudzira hutano hwevechidiki vanogara mudunhu reku Harare Western District. Ruzivo rwakaunganidzwa uye chitupa chako chichachengetwa chakavanzika uye chakavanzika. Ruzivo urwu ruchashandiswa chete nechinangwa cheongororo iyi.

Nguva yatinotora: Kana ukabvuma kutora chikamu muchidzidzo chino, tichataura newe mumwe nemumwe. Hurukuro ichaitika nevaongorori vakadzidziswa, munzvimbo yakavanzika munharaunda yako. Hurukuro isati yatanga, nhengo yeboka retsvakurudzo inozonyora mibvunzo pfupi yakagadzirirwa kuunganidza ruzivo rusingazive nezvemagariro evanhu pamusoro pavo. Vanobva vazobvunzwa mibvunzo pamusoro penyaya dzine chekuita nezvikonzero zvinopesvedzera utachiona hwehutachiwana. Iyo pabvunzurudzo imwe inotora anenge maminitsi makumi maviri. Zvakadaro, hapana kumanikidzwa kutora chikamu muchidzidzo ichi, unogona kusarudza kubuda muchidzidzo chero nguva.

Une mibvunzo here tisati tatanga kubvunzurudza?

Njodzi: Kunyange ukabvuma kutora chikamu, tinongokumbira kuti utore chikamu kana uchida. Ngozi dzekutora chikamu muchidzidzo ichi idiki. Mibvunzo yakabvunzwa

mutsvakurudzo iyi. Vane hukama nevechiri kuyaruka vane HIV, saka, zvinogona kukonzera kusagadzikana mupfungwa, kunyanya kana mhuri yako kana iwe makabatwa zvisina kunaka nechirwere ichi.

Mabhenefiti: Panogona kunge pasina mabhenefiti akananga kune vatori vechikamu pavanotora chikamu muchidzidzo ichi. Zvisinei, kuburikidza nekutora chikamu mune imwe pane imwe vanogona kuziva zvinhu zvinogona kukonzera hutachiona hwehutachiwana husina kudzvinyirira. Ruzivo rwunounganidzwa kubva mukubatsira kwako ruchashandiswa kutibatsira kuona zvikonzero zvakakonzera kukundikana kwako kana kubudirira mukudzvinyirira utachiona hweHIV muropa ravo. Ruzivo rwavo ruchazivisawo vatapi vehutano nezvematanho akakosha ekutora mukuvandudza mhedzisiro yeVana pakurapa.

Mvumo: Ini…… (Mutori wechikamu ari kusaina), ndinobvuma kuti ndanyatsoudzwa nezvenyaya yeongororo iyi. Ndakapihwa mukana wekubvunza mibvunzo uye vakapindurwa zvizere uye zvakajeka. Ndinonzwisisa mabhenefiti, zvinangwa, nemafambisirwo echidzidzo chino. Ndakapihwawo nguva yakakwana yekuti ndiwane kufungisisa nezveruzivo rwakapihwa nekutambirwa. Naizvozvo, ndinosarudza nekuzvipira kutora chikamu muchidzidzo ichi. Ndakaziviswa kuti ndinogona kubuda mutsvakurudzo iyi ndisina kupa zvikonzero kana kutarisana nemipimo ipi zvayo.

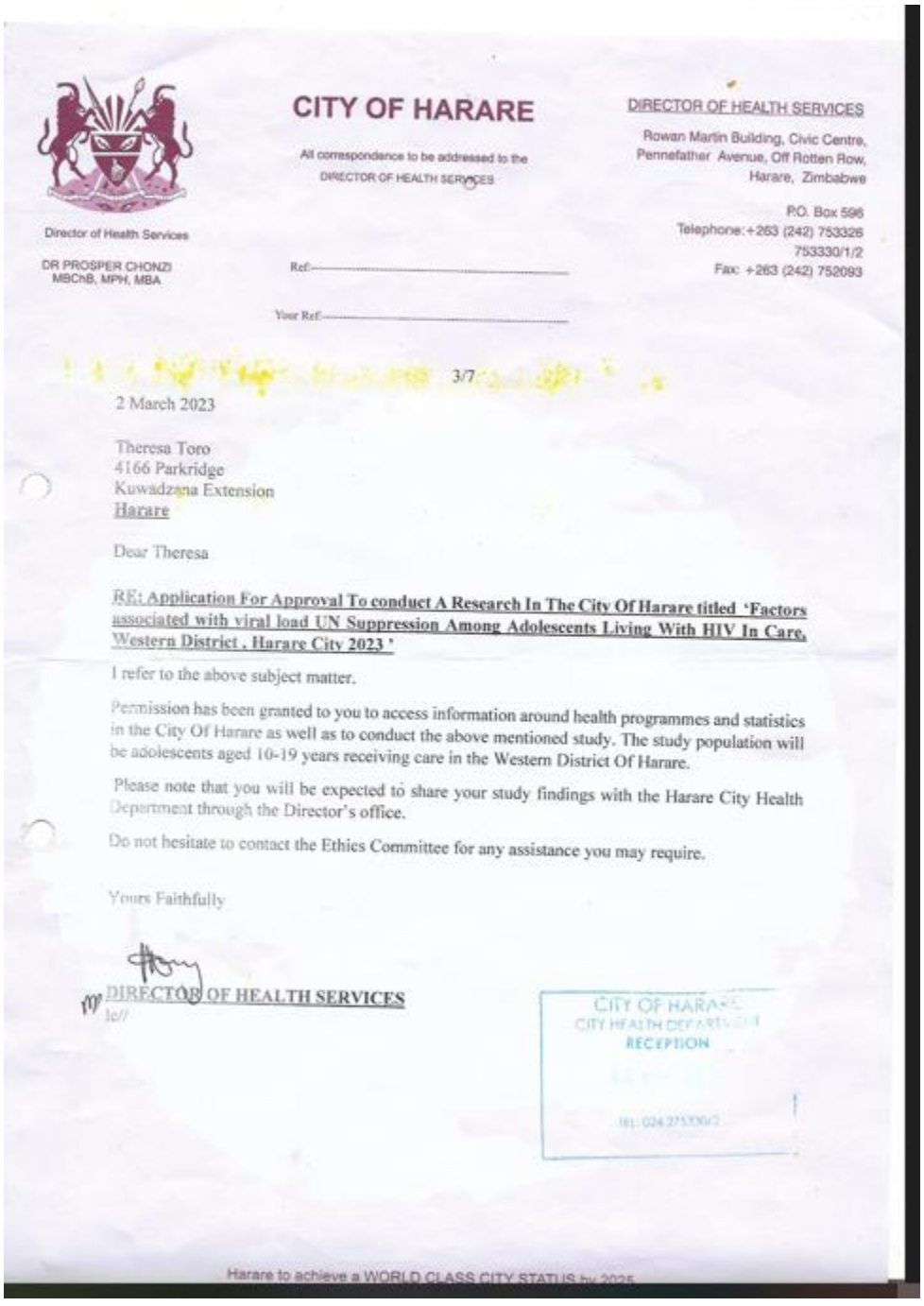
Ndinonzwisisa zvizere kuti kune chero mibvunzo uye kujekeswa nezvechidzidzo ichi ndinogona kubata muongorori chero nguva.

Siginicha yemutori wechikamu/chigunwe chechigunwe _____ Zuva: _____

Siginicha yemubvunzurudzo _____Date: _____

Wekubata: kana muine mubvunza batai .Theresa Toro pa 0777637351

Appendix 9: Approval letter



CITY OF HARARE

All correspondence to be addressed to the DIRECTOR OF HEALTH SERVICES

DIRECTOR OF HEALTH SERVICES
Rowan Martin Building, Civic Centre,
Pennefather Avenue, Off Rotten Row,
Harare, Zimbabwe

P.O. Box 596
Telephone: +263 (242) 753326
753330/1/2
Fax: +263 (242) 752093

Director of Health Services

DR PROSPER CHONZI
MBChB, MPH, MBA

Ref:

Your Ref:

3/7

2 March 2023

Theresa Toro
4166 Parkridge
Kuwadzana Extension
Harare

Dear Theresa

RE: Application For Approval To conduct A Research In The City Of Harare titled 'Factors associated with viral load UN Suppression Among Adolescents Living With HIV In Care, Western District , Harare City 2023 '

I refer to the above subject matter.

Permission has been granted to you to access information around health programmes and statistics in the City Of Harare as well as to conduct the above mentioned study. The study population will be adolescents aged 10-19 years receiving care in the Western District Of Harare.

Please note that you will be expected to share your study findings with the Harare City Health Department through the Director's office.

Do not hesitate to contact the Ethics Committee for any assistance you may require.

Yours Faithfully

DIRECTOR OF HEALTH SERVICES
lc//

CITY OF HARARE
CITY HEALTH DEPARTMENT
RECEPTION

Harare to achieve a WORLD CLASS CITY STATUS by 2025

Appendix 10: AUREC APPROAVAL LETTER

AFRICA UNIVERSITY
Investing in Africa's future

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 Website: www.africau.edu

Ref: AU2936/23 11 September, 2023

THERESA TORO
C/O Africa University
Box 1320
MUTARE

RE: DETERMINANTS OF VIRAL LOAD UN-SUPPRESSION AMONG ADOLESCENTS LIVING WITH HIV IN CARE, WESTERN DISTRICT, HARARE CITY, 2023

Thank you for the above-titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal

- **APPROVAL NUMBER** AUREC 2936/23
  This number should be used on all correspondences, consent forms, and appropriate documents.
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** September 11, 2023
- **EXPIRATION DATE** September 11, 2024
- **TYPE OF MEETING** Expedited
  After the expiration date, this research may only continue upon renewal. A progress report on a standard AUREC form should be submitted a month before the expiration date for renewal purposes.
- **SERIOUS ADVERSE EVENTS** All serious problems concerning subject safety must be reported to AUREC within 3 working days on the standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

APPROVED

Yours Faithfully

MARY CHINZOU
ASSISTANT RESEARCH OFFICER: FOR CHAIRPERSON
AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE

Appendix 11: Gantt chart

Activity	July					August			
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 1	Week 2	Week 3	Week 4
Proposal finalization									
Seeking authority									
Data collection									
Data Analysis									
Report writing									
Development of manuscript									
Dissemination of findings									
Presentation at the monthly meeting									

Appendix 12: Budget justification

Item	**Unit Cost (USD)**	**Quantity**	**Total cost (USD)**
Fuel	$ 1.60	Litres 70	$ 82.20
Bond paper	$ 5	2 reams	$ 10
Pen	$ 0.10	10	$ 1.00
Box files	$3	2	$6
Allowances (research assistances)	$40.00	5 days	$200.00
Grand total			$ 299.20