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ADDIS ABABA UNIVERSITY

COLLEGE OF DEVELOPMENTAL STUDY

CENTER FOR POPULATION STUDIES

**THE RELATIONSHIP BETWEEN VIRAL LOAD STATUS AND FERTILITY
INTENTIONS OF HIV-POSITIVE WOMEN OF REPRODUCTIVE AGES IN ADDIS
ABABA: A FACILITY BASED CROSS-SECTIONAL STUDY**

BY

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ADDIS ABABA, ETHIOPIA



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The Relationship between Viral Load Status and Fertility Intentions of HIV-Positive Women of Reproductive Ages in Addis Ababa: A Facility Based Cross-Sectional Study

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DECLARATION

This is to certify that the thesis prepared by Hirut Alemayehu entitled ‘**The Relationship between Viral Load Status and Fertility Intentions of HIV-Positive Women of Reproductive Ages in Addis Ababa: A Facility Based Cross-Sectional Study**’ is the original work of the investigator. The research complies with university norms and satisfies established standards in terms of originality and quality.

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List of acronyms

AIDS	Acquired Immune Deficiency Syndrome
ANC	Ante Natal Clinic
ART	Antiretroviral Therapy
CD4 Count	Cluster of Differentiation 4 Count
DHS	Demographic and Health Survey
ePMTCT	elimination of Mother – To – Child Transmission
FHAPCO	Federal HIV/AIDS Prevention & control office
HAART	Highly Active Anti-Retroviral Therapy
HIV	Human Immuno – deficiency virus.
MTCT	Mother – To Child Transmission
PLHIV	People Living with HIV/AIDS
PMTCT	Prevention of Mother – To – Child Transmission
PrEp	Pre-exposure Prophylaxis
TPB	Theory of planned behavior
TDIB	Traits-Desires-Intentions-Behavior
UVL	Undetectable Viral Loads
UNAIDS	Joint United Nations programme on HIV/AIDS
UN	United Nations
VLs	Viral Loads
WHO	World Health Organization

Contents

Acknowledgement.....	i
List of acronyms.....	ii
Table of contents.....	iii
List of tables.....	v
List of figures.....	vi
List of appendixes.....	vii
Abstract.....	viii
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background.....	1
1.2 Statement of the problem.....	2
1.3 Research questions.....	4
1.4 Objectives.....	4
1.4.1 General objective.....	4
1.4.2 Specific objectives	4
1.5 Significance of the study.....	4
1.6 Scope and limitations of the study.....	5
CHAPTER TWO: LITERATURE REVIEW.....	6
2.1 Conceptual literature.....	6
2.2 Theoretical literature.....	7
2.3 Empirical literature.....	7
2.4 Synthesis of the literature.....	11
2.5 Conceptual framework.....	12
CHAPTER THREE: RESEARCH METHODOLOGY.....	13
3.1 Research approach and design.....	13
3.2 Sample size and sampling techniques.....	13
3.2.1 Sample size.....	13
3.2.2 Sample techniques.....	15
3.3 Inclusion and exclusion criteria.....	16
3.3.1 Inclusion criteria.....	16

3.3.2. Exclusion criteria.....	17
3.4 Data collection techniques and procedure.....	17
3.5 Description of study variables and measurement.....	18
3.6 Statistical analysis.....	20
3.7 Ethical clearance.....	20
CHAPTER FOUR: RESULT AND DISCUSSION.....	21
4.1 Result.....	21
4.1.1 Descriptive statistics.....	21
4.1.2 Inferential statistics: Relationship between viral load status and fertility intention.....	26
4.2 Discussion.....	32
CHAPTER FIVE: CONCLUSION AND RECOMMENDATION.....	35
5.1 Conclusion.....	35
5.2 Recommendation.....	35
Reference.....	36
Appendix.....	44

List of tables

Titles	Pages
Table 1 – General characteristics of hospitals selected for the study Addis Ababa, Ethiopia, 2022.....	15
Table 2 – Description of Response Variable.....	18
Table 3 – Description of Explanatory variables.....	18
Table 4 – Socio-demographic characteristics of respondents.....	22
Table 5 – Percentage distribution of participants’ fertility intentions.....	24
Table 6 – HIV related characteristics of respondents’	25
Table 7 – Unadjusted odds ratios with 95 % confidence intervals for the relationship between viral load status and fertility intention.....	27
Table 8 – Adjusted odds ratios with 95 % confidence intervals for the relationship between selected factors with fertility intention.....	30

List of figures

Title	pages
Figure 1 - Conceptual Framework for Fertility Intention among HIV-Positive Women of Reproductive Ages having Viral Load Status.....	12
Figure 2 - Schematic Presentation of the Sampling Frame of Fertility Intention among HIV-Positive Women of Reproductive Ages at Addis Ababa, Ethiopia, 2022.....	16
Figure 3 - Percentage distribution of reproductive ages PLHIV women have viral load status in Selected hospitals Addis Ababa, Ethiopia, 2022.....	21

Appendixes	pages
Appendix I: English questionnaires version.....	46
Appendix I: Amharic questionnaires version.....	51

ABSTRACT

Back ground: People living with HIV/AIDS (PLHIV), like everyone else, want and intend to have children. Although the fertility impact of HIV is already well acknowledged, women's fertility behaviors could also largely be influenced by the level of their viral loads. Being sexually active and not taking contraception, women who never became pregnant had greater HIV viral loads.

Objectives: to assess the relationship between viral load status and fertility intentions of HIV positive women of reproductive ages in six selected public health hospitals, in Addis Ababa, Ethiopia.

Methods: A sample size of 432 reproductive ages HIV-positive women who got ART service at selected public hospitals were interviewed. A binary logistic regression analysis was used to assess the relationship between viral load status and fertility intention.

Results: Of the total respondents, 196 (45.4%) had intention to give birth within the coming 3 years, while the remaining 236 (54.6) had no intention. Fertility intention was 2.71 times higher among women of ages 25-34 compared to age > 34 years (95% CI: 1.005-7.339). Moreover, married women had fertility intention 6.06 times higher (95% CI: 1.12-32.7) compared to widowed women. Further, fertility was higher among women who knew their partner HIV status. Intention was 5.63 times higher (95% CI: 0.846-37.484) and 19.28 times higher (95% CI: 2.533-148.326) among women who knew their partner HIV status to be positive and negative respectively, compared to those with no knowledge of their HIV status. On the other hand, fertility intention decreased for women with no formal education and primary by 95.1 (95% CI: 0.010-0.252) and 83.9 (95% CI: 0.039-0.662), respectively compared to secondary and above level of education. For women who believed they have enough number of children; the odds of fertility intention decreased by 99.7 (95% CI: 0.001-0.011). Further, the odds of fertility intention of women who made decision on pregnancy or contraceptive use alone were lower by 71.5% compared to those who jointly made the decision.

Conclusion and Recommendation: - A high proportion of HIV positive reproductive ages women desire to conceive. However, the finding witnessed that there was no significant association between viral load status and fertility intention. Beside that there was no fertility differentials between women who have undetectable and detectable viral loads. The findings strongly implicate the need for strengthening and proper implementation of the various health policies and guidelines pertaining to HIV/AIDS for increased uptake of reproduction health services by PLHIV women. The government and other stakeholders should reach young women including sexually active with HIV prevention, testing and treatment services.

Keywords: fertility intention, viral loads, undetectable/detectable, durable viral suppression

CHAPTER ONE

INTRODUCTION

1.1 Background

Giving birth and motherhood play an important role in women's social status and self-identity in many countries. People living with HIV/AIDS, like everyone else want and intend to have children (UNAIDS, 2009). PLHIV's reproductive health needs, notably fertility desires, family planning, and pregnancy needs, are complicated and limited because of their HIV status. Women's desire to have more children is hampered by their HIV status (Wekesa and Coast, 2014 ; Ayieko, et al. 2017). Further, the impacts of HIV on fertility is highest among women who have AIDS-related symptoms, have been infected for a longer period of time and are immune suppressed or have high viral loads (Gray, et al., 1998). Despite being sexually active and not taking contraception, women who never became pregnant had greater HIV viral loads than those who did get pregnant and gave birth to a live baby (Nguyen, et al., 2006). The desire for fertility among PLHIV women may put them at risk of HIV vertical transmission and non-virally suppressed PLHIVs are at a high risk of infection (UNAIDS, 2021).

People living with HIV who take antiretroviral medications, regular medical visit and have consistent undetectable viral loads (UVLs) for at least six months are less likely to transmit HIV sexually and are less likely to transmit HIV to their babies during pregnancy and delivery (Fact Sheet, 2021; Quinn, et al., 2000). The date of initiation of antiretroviral medication (ART) and HIV viral load of the mother are major predictors of perinatal mother-to-child transmission (MTCT).

The 2030 Agenda for Sustainable Development includes goals for countries to increase antiretroviral therapy coverage and to go beyond viral load suppression in order to end the AIDS epidemic it leads PLHIV women plan families, go through pregnancy and childbirth for eliminating vertical HIV transmission (UNAIDS, 2021).

Evidence suggests that HIV-positive women want to have more children to varied degrees. According to two studies conducted in Canada and Malawi, respectively, 69 percent and 17 percent of HIV-positive women wished to have children in the future (Krashin, et al. 2018; Loutfy, et al. 2009). Different studies in Ethiopia have found varying degrees of fertility desire among HIV-

positive women. For example, a research conducted in Nekemt Town, Tigray and Addis Ababa found that 42.1 percent, 45.5 percent, and 56.2 percent of HIV-positive women exhibited fertility desire, respectively (Shifera, et al., 2020).

1.2 Statement of the problem

Globally, the predicted total number of new infections in 2019 is more than three times greater than the milestone of 500 000 set for 2020, indicating that progress on HIV transmission prevention is far too slow (UNAIDS, 2021). One-third of patients living with HIV do not begin therapy until they are so sick that their CD4 count falls below 200 cells/mm³ and they are diagnosed with AIDS (UNAIDS, 2018). Because roughly 3.5 million out of 25.4 million people living with HIV (PLHIV) on treatment are virally non-suppressed, we will not be able to meet global targets to eliminate AIDS as a public health issue by 2030 (Okoli, et al., 2020). Immune destruction, disease progression with a higher risk of mortality and an increased chance of HIV transmission are all outcomes of continuous high viral load (Sher, 2020).

Due to poor health, fear of infecting one's spouse or fetus and discouraging policies in many countries, the incidence of fertility desire/intention among PLHIV has been low for the past two decades (Du Lou, et al., 1997). According to an Ethiopian survey, the percentage of HIV- positive people who want to start a family increased from 20.0 percent in 2010 to 42.1 percent in 2013 (Getachew, et al. 2010; Sufa, et al. 2014). According to a study conducted in South Africa, supportive policies and guidelines for safer conception counseling and promotion of PLHIV sexual reproductive health (SRH) rights exist, but implementation challenges exist due to providers' limited knowledge of safer conception options and concerns about discussing safer conception with HIV- positive couples (Cooper, et al. 2015; Davies, et al. 2017). The desire to have children is impeded in the case of HIV-positive women living in high-burden setting by a lack of knowledge/information, communication, health care services and other resources (Nattabi, et al. 2009; Schwartz, et al. 2012).

Different research revealed that fertility-related characteristics and fertility aspirations varied depending on the country. A recent systematic review and meta-analyses in China demonstrated that fertility desire is linked to ART use, sex, age, marital status, number of children and educational level among PLHIV. HIV-positive men who are on antiretroviral therapy (ART) are under 30 years old, married/cohabiting, childless and have a secondary education or higher have a

greater prevalence of reproductive desire. Additional steps to prevent HIV horizontal and vertical transmission should be addressed through reproductive health counseling and care. Furthermore, their reproductive needs should be met with a focus on PLHIV (Yan, et al., 2021).

In Uganda, a research revealed that at viral loads larger than 31,623 copies/mL there is a link between HIV viral load and lower fertility. This is important in HIV-positive communities because increased viral load can bias antenatal surveillance-based estimates of HIV prevalence in reproductive-aged women. Furthermore, the findings imply that antiretroviral medication may improve the likelihood of HIV- infected women having live babies after their pregnancies (Nguyen, et al., 2006).

Women living with HIV/AIDS and fertility intention have been researched in Ethiopia. According to research conducted at Jimma University Medical Center, factors that influence fertility desire among HIV positive persons include: educational level, partners' fertility desires, number of children and partners' HIV status. Integrated access to contraceptive techniques, counseling on reproductive health decision - making and the use of contraceptive methods to avoid unwanted pregnancies should all be included in interventions to address this problem (Sufa, et al., 2014). Different criteria were included for fertility intention in this study as well as the intervention section although viral load status was not mentioned.

In fact, if PLHIVs are on ART and verified virally suppressed with maintained high levels of adherence over the long term undetectable viral loads reduces the risk of HIV transmission between partners and from mother - to - child to zero (Loutfy, et al., 2009). Vertical transmission can be reduced by ensuring HIV - positive women have the ability to make decisions about their fertility (UNAIDS, 2020).

As a result, there is ample research have been undertaken to better understand HIV/AIDS to fertility desire but much less research on linking the relationship between viral load status and fertility intention in the context of different countries and in conceptual issues. In Ethiopia, looked through different literature focused on HIV/AIDS to fertility desire but not exhaustively outlined and focused the relationship between viral load statuses in PLHIV with relation to their fertility intention. Absence of relevant and timely studies in the subject seems to have hindered relevant policies and practices on increasing ART adherence, and hence suppress viral load status, among significant proportion of PLHIV. Further, increased evidences would enable policy makers and the

public to understand the benefit of viral load suppression and its impact on fertility dynamics. Thus, in order to close the gap, look into it and complete the gaps that are relevant to the relationship between viral load statuses in HIV positive reproductive ages women fertility intentions.

1.3 Research Questions

The leading research questions for this study was:

- What are fertility intention differentials of HIV positive reproductive ages women by their viral load status?
- What are the characteristics of HIV positive reproductive age's women viral load status and their adherence?
- Do fertility intentions and viral load status related to demographic and other variables?

1.4 Objectives

1.4.1 General objective

To identify the relationship between viral load status and fertility intentions of HIV positive women of reproductive ages at selected six public health hospitals, Addis Ababa, Ethiopia in 2022 G.C.

1.4.2 Specific objectives

- To assess HIV positive reproductive ages women's fertility differentials by their viral load status
- To characterize HIV positive reproductive ages women viral load status and their adherence
- To identify and examine the relationship between viral load status and fertility intention by demographic and other variables

1.5 Significance of the study

For some African nations, like Ethiopia, the study of the relationship between viral load status in HIV positive reproductive ages women and fertility intention are novel. The outcomes of this study will help to inform future research and practice in the area of HIV positive reproductive age's women have viral load status who want to start a family.

This study will be beneficial to a wide range of stakeholders that are dealing with fertility intention and viral load status.

For stakeholders

Give background to the new study's services in order to organize education programs and trainings to raise awareness about viral load status.

For researchers

This study can be used as a starting point for any researchers working on related themes or discoveries.

For policy makers

To improve PLHIV access to services, provide a solid foundation for policy and strategy.

1.6 Scope and limitations of the study

Scope

To make the findings representative, the study was conducted in Addis Ababa, at chosen public hospitals and at random in Addis Ababa. Male LHIV and female partners who are on Highly Active Anti-Retroviral Therapy (HAART) treatment, have viral load status and in spite of the crucial influence they might play in determining the size of their family, was not be included in the study. The majority of the participants in the study was HIV positive reproductive ages women and health care workers.

Limitation

- The frequency of viral loads testing differed amongst patients which could lead to bias results in terms of the time to viral load status.
- The cross sectional design nature of the study, which uses a snapshot of data on fertility intentions limit the ability of the study to examine casual association between the predictors and the outcome.

CHAPTER TWO

2 LITERATURE REVIEW

2.1 Conceptual literature

The term "viral load" refers to the amount of HIV in a person's blood and the higher the viral load, the faster a person's immune system is destroyed, the more likely they are to contract diseases that the body would typically be able to fight off easily (UNAIDS, 2018). Antiretroviral therapy keeps HIV-positive people healthy, improves their quality of life, and reduces the amount of virus in their blood and other bodily fluids to undetectable levels (UNAIDS, 2017). Undetectable viral loads is described as typically HIV-1 RNA < 20 copies/ml or have viral suppression HIV RNA < 200 copies/ml on consecutive measurements every 4 to 6-months (LeMessurier, et al., 2018). The term "undetectable" refers to the sensitivity of the viral loads assay utilized in the lab. Even if a viral load test fails to detect HIV in a blood sample, this does not mean the virus has disappeared; rather, it implies that ART has suppressed the virus to the point where standard laboratory tests can no longer "detect" or "find" it (FHAPCO/MOH, 2021). Undetectable viral loads concept assists HIV-positive women in making fertility decisions that benefit their personal health while avoiding vertical transmission (Gina, et al., 2007). Reduced perinatal mother-to-child transmission (MTCT) can be achieved by starting antiretroviral therapy (ART) before pregnancy and maintaining a lower viral load throughout pregnancy (Mandelbrot et al. 2015). Furthermore People living with HIV are regaining their quality of life, enjoying their families, looking forward to a bright future, and intending to have an HIV-free child (UNAIDS, 2017).

In Ethiopia, the notion of viral loads status that is detectable and undetectable level are used in the HIV/AIDS program and intervention to raise awareness for viral load testing, client education for adherence to antiretroviral therapy (ART), and maintaining viral suppression and reaching undetectable viral levels in their blood. Apart from that, efforts to reduce a person's viral load to undetectable levels and prevent the virus from spreading must be tailored to the individual, taking into account the duration of viral suppression, adherence to antiretroviral medications and the desire to become pregnant (FHAPCO , 2021).

2.2 Theoretical literature

General theory used by researchers to understand reproductive decision-making at the individual level comes from psychology. The theory of planned behavior (TPB) which evolved from the idea of reasoned action was put forward with the goal of predicting and explaining human behavior in certain situations (Ajzen, 1988). Planned Behavior can be applied to fertility decisions. Fertility intentions change across the life course and have been found in some circumstances to correspond only weakly with subsequent outcomes (Morgan & Rackin, 2010). Central to the theory is an individual's intention to perform a certain behavior. Three key, conceptually independent aspects are thought to influence intention: a behavior (attitude), socially predicted way of conduct (norm), and individual behavior (perceived behavioral control). The link between intention and behavior is then mediated by behavioral control. Thus, the theory is general in that it can be applied to all cases of intentional or purposeful behavior where an individual has the ability to exercise choice that is, to make conscious or 'reasoned' decisions and it is concerned with intentional or purposeful actions where an individual has the ability to exercise choice that is, to make conscious or 'reasoned' decisions (Klobas, 2011).

Other theories to understand fertility intentions developed by Miller is Traits-Desires-Intentions-Behavior (TDIB) framework. According to this theory, the construction of motivations is the first step in the process of becoming a mother. These motives are subsequently activated as a person's wishes for parenthood which are eventually translated into plans to start a family (Miller, 1994). Personal and societal elements like as age, marital status, degree of education, income, ethnic background, number of surviving offspring and high social values are all motivating factors for childbearing. People living with HIV have more complex social and health reasons for desiring children, which may include health-related variables as well as cultural background and personality traits. HIV-related characteristics such as quality of life, antiretroviral drugs use and time since diagnosis of infection, disclosure status and stage of disease progression are all potential motivators (Wagner, et al., 2014).

2.3 Empirical literature

The fertility intentions and HIV has been researched in a variety of countries and throughout different time periods. The findings reveal the complexities of the outcomes in many locations and countries.

A number of empirical studies of fertility intentions or reproductive behavior have based their analyses on planned behavior theory (TPB) (Ajezen & Klobas, 2013). Implementing the theory to examine fertility intentions and outcomes in Italy, they find that none of its core dimensions (attitudes, norms and perceived behavioral control) affects fertility behavior directly but that, contrary to the theory, some background factors (such as woman's age and duration of a couple's relationship) do directly affect fertility intentions and realizations (Mencarini, et al., 2015).

In a Canadian study age, ethnicity and marital status were found to be indicators of fertility intention among HIV-positive women. 79.1 percent of women of reproductive age are 44 years and 25.8 percent of HIV-positive women expressed a desire to start a family. Non-aboriginal ethnicity, younger age and having a regular partner were all associated to the desire to have children in the future. HIV-positive women plan to have children at rates comparable to the general population, regardless of their clinical HIV status. Increased numbers of HIV-positive women who wish to have children must be considered and planned for by public policymakers and health practitioners (Gina, et al., 2007).

Due to improvements in the life expectancy of HIV/AIDS patients the study in Rwanda demonstrates changes in fertility desire among HIV positive women and other developing countries. Demographic and socioeconomic factors play a big role in HIV - positive women's fertility wishes. Low fertility desire is associated with a woman's age of 35–49 years. The health-care system should be ready to ramp up services for prevention of mother – to - Child transmission (PMTCT), maternal and child health care and fertility planning. Young women with fewer living children should be targeted for interventions and their contraceptive requirements should be met (Niragire, et al., 2021).

The study in Ethiopian revealed that age, HIV disclosure status to husband/sexual partner and having a small number of living children were all found to influence PLHIV women's reproductive desire. Women in the 15-24 and 25-34 year age group had higher fertility desire than women in the 35-49 year age group. Fertility desire was linked to having no children, having one to two children and disclosing HIV status to husband/sexual partner. These findings have significant implications for Tigray's sexual and reproductive health policy and practice, as well as existing HIV/ART care (Adamu, et al., 2014).

The desire for fertility among PLHIV women may put them at risk of HIV vertical transmission. HIV treatment is a highly effective approach and method for preventing HIV transmission. Most publications on the relation between ART adherence and mother - to - child transmission (MTCT) considered.

According to a study conducted in the United States the desire and expectation to have children has important implications for the prevention of mother - to - child transmission (PMTCT) and heterosexual HIV transmission, the need for counseling to facilitate informed childbearing decisions and the future demand for social services for children born to infected parents. Overall, 28-29 percent of HIV-positive men and women in the United States who are receiving medical care want to have children in the future, 69 percent of women and 59 percent of men who want children believe they will have one or more children in the future (Chen, et al., 2001).

The scale of fertility ambitions and intents according to a study conducted in Nigeria, poses a threat to HIV preventive strategies against mother - to - child transmission (MTCT) and heterosexual transmission. Even though 71.5 percent of men and 93.8 percent of women said, they planned to have more than two children in the near future. Only 4.3 percent of those who desired children stated that they had no plans to have any. It might be a good idea for caregivers to forsake their conventional anti - pregnancy advice in the case of HIV-positive persons who want to create a family and instead provide complete information about HIV-positive people's reproductive options (Oladapo, et al., 2005).

In Ethiopia, the prevalence of fertility desire and understanding of prevention of mother - to - Child transmission (PMTCT) was found to be 58.8 percent and 30.7 percent, respectively, according to the study. Younger age, spouse education, occupation, recent HIV test and volunteer testing were all found to be significant factors in fertility desire. Similarly, PMTCT knowledge was higher in the younger age group, voluntary testing and counseling and those taking ART for more than five years. As a result, increasing voluntary prevention of mother - to - child transmission (PMTCT), testing and counseling during follow-up treatment as well as partner involvement is guaranteed to reduce mother - to - Child transmission (MTCT) (Daba, et al., 2020).

Individual, societal, demographic, and health factors may influence the level of reproductive desire shown in several researches in PLHIVs.

Fertility desire in PLHIV is associated to ART experience, sex, age, gender, marital status, the number of children and educational level, according to a Chinese study. All factors associated with PLHIV fertility desire. The prevalence of reproductive desire is higher in HIV-positive men on antiretroviral therapy (ART), younger than 30, married/cohabiting, childless and have a secondary education. Other steps to prevent HIV horizontal and vertical transmission should be addressed through reproductive health counseling and care. Furthermore, their reproductive needs should be met, with a focus on PLHIV (Yan, et al., 2021).

Fertility desire was linked to longer ART duration in female participants but not in males, according to a South African study. Women and men living with HIV who are on antiretroviral therapy (ART) want to have children in the future. This emphasizes the significance of including fertility counseling, contraception and information on safe conception and delivery in HIV treatment programs. Fertility desires can vary over time necessitating continual monitoring as part of long-term care (Myer, et al., 2007).

Antiretroviral therapy for HIV-positive people, fertility and childbearing difficulties have received minimal attention in Ethiopia. According to a cross-sectional survey 42.1 percent of PLHIV intend to have children in the future. Fertility desire was associated to educational achievement, spouse fertility desire, the number of living children, and partner HIV status. Integrated access to contraception options and counseling on reproductive health decision-making are two interventions to address this challenge (Sufa, et al., 2014).

A key component of safer conception methods are ART as prevention, adult HIV testing and VL (Viral Load) results and adult HIV prevention efforts helps to achieve elimination mother-to-child transmission (e-MTCT) (Matthews, et al., 2012). Beside that the new idea of viral load status in relation to fertility intention has linked to pregnancy, family planning utilization and reproductive health services.

A study found that in Mombasa, Kenya when women did not use non-barrier contraception, fertility desire was linked to a higher chance of biological evidence of semen exposure. Low HIV transmission potential regardless of desire for children shows that the use of condoms and adherence to ART was successful (Wilson, et al., 2018).

A study found that in France early and persistent management of viral load reduces the residual risk of HIV. In 10 of the 16 cases of during pregnancy and after giving birth transmission the difference remained significant. The only factor that was independently linked to HIV PMTCT was viral load. Whether selecting when to start antiretroviral medication during pregnancy guidelines should consider not only Cluster of Differentiation (CD4+) count and the risk of preterm birth but also baseline viral load (Tubiana, et al., 2010).

Rapid ART initiation results in good viral load suppression, according to a study conducted in Ethiopia, when ART is started quickly the viral load is suppressed more than when it is not started quickly. In comparison to those who are not educated, 13 percent of those with primary education had viral load suppression. When compared to customers who have good treatment adherence, poor drug adherence had low viral load suppression. Despite the fact that quick ART commencement results in good viral load control. Strict adherence is required for the program's successful implementation and achievement of its final purpose (Mideksa, 2021). In this aspect, obtaining undetectable viral load levels, maintains and helps get a healthy lifestyle and increases desire to have a baby (Thomford, et al., 2020).

2.4 Synthesis of the literature

The motivations for wanting children are the same among PLWHA as they are among the general population: happiness and fulfillment associated with motherhood, as well as cultural pressure (Cooper D. , et al., 2007). Aside from that, fertility intentions alter throughout time and have been found in some circumstances. There has been a lot of study undertaken to better understand HIV to fertility desire but much less research linking and focusing on the relationship between viral load status and fertility intention. Demographic and socioeconomic factors play a big role in HIV positive women's fertility wishes. Other factors such as husband/sexual partner and having a small number of living children and poses a threat to HIV preventive strategies against mother - to - child transmission (MTCT) and heterosexual transmission influence HIV positive women's fertility desire. On the other hand, by focusing on early initiation of ART and high level of adherence over the long term to get good viral load status HIV positive women can reduced vertical transmission and increase ability to make decision about their fertility. Therefore, this study was examine the relationship between viral load statuses in HIV positive reproductive ages women fertility intentions in Addis Ababa, selected public hospitals.

2.5 Conceptual framework

This framework showed the relationship between dependent variable (fertility intention) and independent variables that could predict the outcome. The literature has been used to create this conceptual framework.

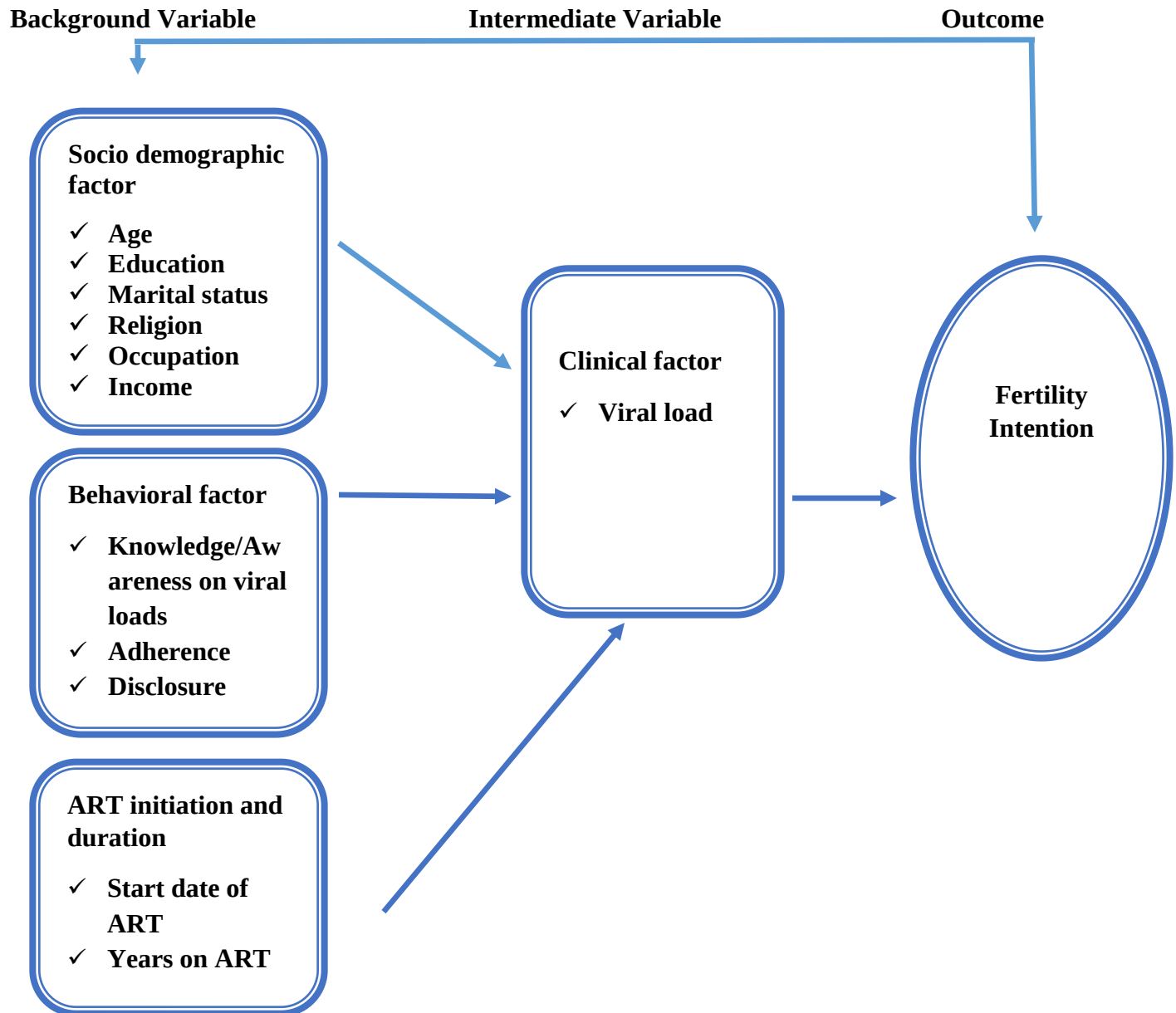


Figure 1: Conceptual framework for fertility intention among HIV-Positive Women of Reproductive Ages have viral load status

Students Source: developed by the author based on Literature Review (Shifera, et al., 2020).

CHAPTER THREE

3 RESEARCH METHODOLOGY

3.1 Research approach and design

A descriptive research was considered quantitative research approach. Quantitative approach was employed using routinely collected hospital based data. Aside from that information was obtained regarding ART and other services at the time of study from the heads of the facilities and service providers (Medical Directors, Head Nurse and Administrators).

3.2 Sample size and sampling techniques

Purposive sampling was used to select six public hospitals managed by Addis Ababa health bureau that have a large number of HIV positive reproductive age women having viral load status, as determined by Smart Care data base or document review.

The target population for this study was all HIV positive women on ARV treatment in Addis Ababa city. The study population was all HIV positive reproductive age women on ARV (Antiretro Viral Treatment) for above one year and have durable viral suppression at six randomly selected public hospitals.

3.2.1 Sample size

The sample size was calculated using two population formula. To calculate the minimum sample size, the proportions of women living with HIV/AIDS whose viral load status were determined. Hence it was important to pick the most suitable indicator for sampling purpose. Since studies in Ethiopia on the subject are rare, the sampling calculation was based on the population proportions reported in a hospital-based study conducted in Southwest Ethiopia (Shifera, et al., 2020). Viral load status of the women living with HIV was taken as the main predictor of outcome fertility desire. Thus, using the proportion of women having fertility intention with undetectable viral load ($p_1 = 0.78$) and those with detectable viral load status ($p_2 = 0.69$) (Shifera, et al., 2020). Therefore, the minimum sample size was calculated using the formula for two population proportions as follow.

$$n = (Z_{\alpha/2} + Z_{\beta})^2 \times (p_1(1-p_1) + p_2(1-p_2)) / (p_1 - p_2)^2$$

Where,

$Z_{\alpha/2}$ = is the critical value of the normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96)

Z_{β} = is the critical value of the normal distribution at β (e.g. for a power of 80%, β is 0.2 and the critical value is 0.84) and p_1 and p_2 = are the expected sample proportions of the two groups.

$$n = \frac{(1.96 + 0.84)^2 \times ((0.78(1-0.78) + 0.69(1-0.69)))}{(0.78 - 0.69)^2}$$

$$n = \frac{7.84 \times (0.78(0.22) + 0.69(0.31))}{0.0081}$$

$$n = \frac{7.84 \times 0.3855}{0.0081}$$

$$n = \frac{3.02232}{0.0081}$$

$$n = \underline{\underline{373}}$$

Substituting these values in the formula will give a minimum sample size of 373. This is adjusted by finite population formula

$$n' = 1 / (1/n + 1/N)$$

Where,

n = 373 sample size

N = 7314 total number of HIV positive reproductive age women in the selected hospitals

$$= \frac{1}{(1/373 + 1/7314)}$$

= 355, assuming a 20 % non- response rate, the sample size would be

$$= \underline{\underline{433 \text{ women}}}$$

Once the sample size determined, to get the two group dividing 433 equally yields $p1 = 216$ and $p2 = 217$ HIV positive reproductive ages women. To allocate proportionally at the selected public hospitals by considering numbers of HIV positive reproductive ages women.

3.2.2 Sampling techniques

The research was carried out in Addis Ababa's selected public hospitals including Zewditu Memorial Hospital, Yekatit 12 Hospital, Ras Desta Hospital, Menilik II Hospital, Ghandi Hospital and Trunesh Beijing Hospital which are health facilities that provide comprehensive HIV care and treatment and have a substantial number of PLHIV clients. The field work was conducted from March to May 2022. Based on each public hospital the study participants were selected using systematic random sampling method. Number of HIV positive reproductive ages women who have detectable viral load ($p2$), i.e. $Kth = N/n$ ($7,008/217 \approx 32$) and undetectable viral load ($p1$), i.e. $Kth = N/n$ ($306/216 \approx 1.4$). HIV positive reproductive ages women attending ART services who have viral load statuses was recruited as study units in each public hospitals.

Table 1: General characteristics of hospitals Selected for the study Addis Ababa, Ethiopia, 2022.

No	Facility name	Hospital type	Number of clients served in ARV treatment unit	Number of HIV positive reproductive ages women have detectable viral loads	Number of HIV positive reproductive ages women have undetectable viral loads
1	Zewditu Memorial Hospital	Regional hospital	2,340 clients (N1)	2,213	127
2	Yekatit 12 Hospital	>>	1,620 clients (N2)	1,555	65
3	Ras Desta Hospital	>>	1,016 clients (N3)	984	32
4	Menilik II Hospital	>>	1,290 clients (N4)	1,245	45
5	Ghandi Hospital	>>	740 Clients (N5)	715	25
6	Trunesh Beijing Hospital	>>	308 Clients (N6)	296	12
Total			7,314 clients	7,008	306

$N_1 \times n$

N

Where,

$N_1 \dots N_6$ = number of clients in each hospitals

n = required sample size

N = total number of clients in all selected hospitals

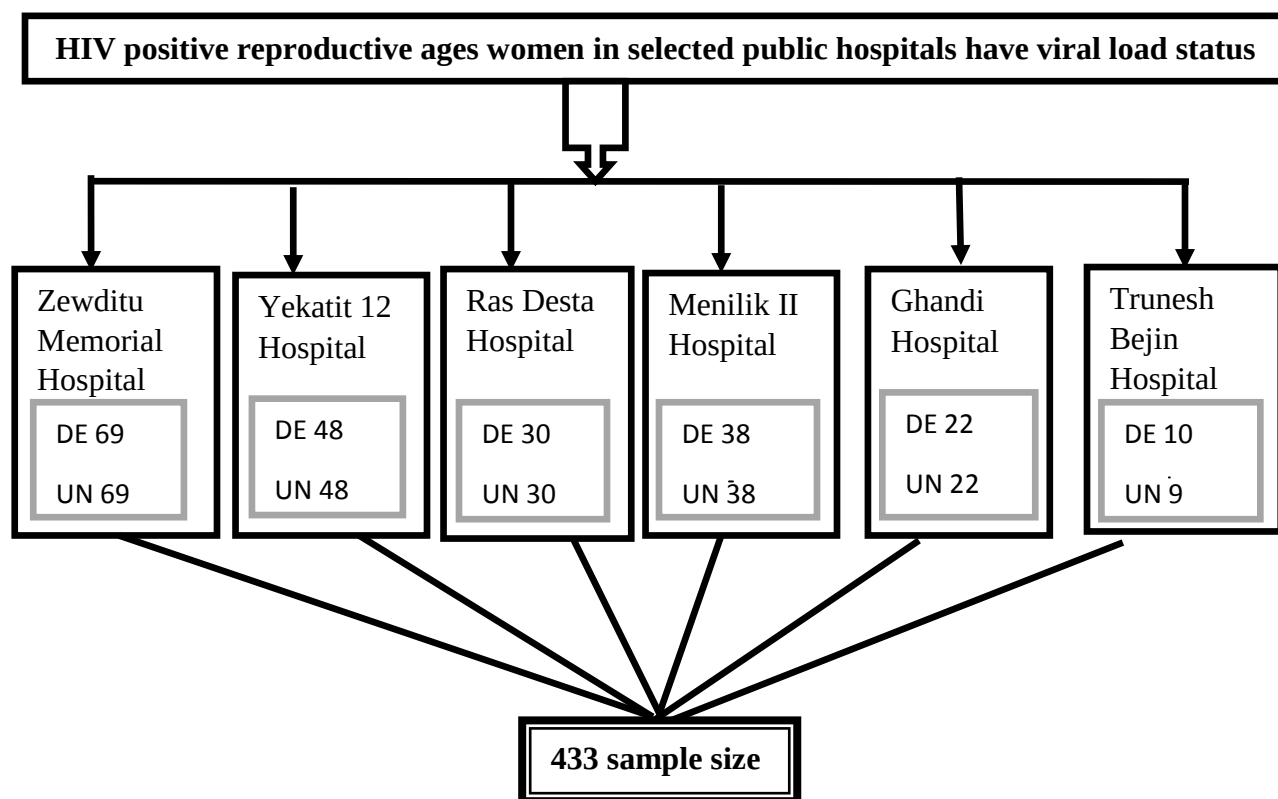


Figure 2. Schematic presentation of the Sampling frame of fertility intention among HIV-Positive Women of Reproductive Ages at Addis Ababa, Ethiopia 2022

3.3 Inclusion and exclusion criteria

3.3.1 Inclusion criteria

- Reproductive ages women 15 – 49 years, who are on Highly Active Antiretroviral Therapy (HAART)
- On HAART for above 1 year and have durable viral suppression

- HIV positive reproductive ages Women who volunteered to give an interview in selected public hospitals.

3.3.2 Exclusion criteria

- All men with HIV and HIV positive women partners
- Female ages below 15 and above 49 years
- Those who was not available during the time of interviewee's time
- New diagnosed HIV
- Pregnant women, women who gave birth less than one year and in fecund/infertile women

3.4 Data collection techniques and procedures

Both primary and secondary data collection tools were employed. Primary data were collected using individual questionnaire. Secondary data were obtained from health facilities' ART registers, client cards and Smart Care electronic database. Other facility-specific information was obtained from the institutions concerned. The data collection tool was adopted from previous similar studies. For instance, a study carried out in South Africa to evaluate safer conception/fertility services they used different collection tools for their study such as reviewed relevant guidelines and literature, in-depth interviews and survey questionnaire (Schwartz, et al., 2014).

The survey questionnaire was used to interview PLHIV women in person or using phone interview because of the small numbers in each public hospitals concerns to their fertility intention and other related information.

Each questionnaire was reviewed for consistency and completeness during data collection. Pretesting of the tools was done on one selected health facilities and 10 - 15 women addressed prior to the actual data collection period. Twenty one case managers and adherence supporters were participated in the data collection. They received training on the objective of the study, the interview and confidentiality of information, completeness of data and selection of study subjects. During the data collecting process, every effort was made to ensure data quality. The tools were prepared in English after reviewing literature of similar surveys that have been carried out previously. Well prepare tools were translate to Amharic. The tools assessed socio-demographic

and economic characteristics, fertility intention, clinical characteristics and viral load status related knowledge and etc.

3.5 Description of study variables and measurements

According to a study carried out in Nigeria used to hypothesized fertility intention and desires of HIV-positive patients by various variables by age, marital status, disclosure status, income level, fertility history, time since diagnosis of HIV infection and health status, partners' fertility desires, stage of their disease, quality of life, access to antiretroviral drugs, disclosure status and emotional state and etc, (Oladapo, et al., 2005).

The study used fertility intention as an outcome variable and the explanatory variables are socio demographic characteristics (age, marital/relationship status, education, occupation, religion income), number of alive children, knowledge/awareness to viral load (VL), children HIV status, partner's HIV status, partner's desire for children, ART initiation and duration, ART adherence, disclosure status, viral load status, family planning utilization, pregnancy seeking behavior and health facilities from the previous studies.

Table 2: Description of the Response Variable

Dependent Variable	Definition	Category
Fertility Intention	Fertility intention refers to expectation to have future children (Oladapo, et al., 2005)	Do you intend to bear children in the future..? yes or no answer

Table 3: Description of Explanatory Variables

Independent Variable	Definition	Category
Age	Age from 15- 44 years (Chen, et al., 2001)	15-19,20-24,25-29,30-34,35,39,40-44, 15-49 years+ of age
Marital Status	Relationship status (Chen, et al., 2001)	Classify respondents in the following categories: married; non married; separated or

		divorced; widowed; never-married
Educational status	Status of the woman (Yaya, et al., 2020)	Classified as no education, primary and secondary/ higher
Time since HIV diagnosis (years)	HIV diagnosis (Hemando, et al., 2014)	Categorized as < 2 years, 3–5 years, or > 5 years
ART Adherence	ART adherence (Ahmed, et al., 2021)	Categorized as if the person missed 2 doses ‘good’, missed 3 – 5 doses ‘fair’ and missed 6 doses ‘poor’
Viral load	The amount of virus in a sample of blood (Oudsten, et al., 2019)	First category: the virus is not a detectable level, second and third category detectable level < 20 or ≥ 20 HIV copies per milliliter of blood respectively
Number of children	Participants self-reported their current number of children in response to the question and the number of children expected from the question	"How many children do you have?"
Pregnancy seeking behavior	Actions towards trying to conceive (Wagner, et al., 2014)	Stopped using any birth control method in the past 12 months, yes or no answer
Partner's desire to have children	For respondents who had a spouse or an opposite- sex partner (Chen, et al., 2001)	Partner's desire to have children was coded "yes" may not have desired children “No”
Partners HIV status	HIV test result (Mmbaga, et al., 2013)	Positive, negative or do not know
HIV status disclosure	For HIV-positive participants, HIV status disclosure to partner (Visser, et al., 2008)	assessed using an adapted Disclosure Scale, to tell or not to tell

3.6 Statistical analysis

The data collected were processed using Statistical Packages of Social Science (SPSS) version 26 computer software programs. Frequency tables were used to report the socio-demographic profiles, fertility related characteristics and HIV viral load status. A chi-square analysis was used to assess a bivariate association between women's fertility intention and selected variables. Bivariate logistic regression was used to screen candidate variables for further analysis in multi- variable binary logistic regression model. For this a p-value of 0.25 or less on the bivariate were selected. The multivariable logistic regression analysis examined the net effects of each independent variable on fertility intention. A p-value of < 0.05 was used to declare significance level. An adjusted odds ratio with a 95% confidence interval along with the coefficients and associated alpha values were used to see the strength of association between independent variable and the outcome variable. Multi-collinearity among the independent variables was checked.

3.7 Ethical clearance

The study was obtained ethical approval from the institutional research ethical committee (IREC) of Addis Ababa University College of developmental studies and the official letter was taken and given to selected public hospitals to get the full reporting data base of HIV positive reproductive ages women who have viral load status. The respondents was informed about the objective and purpose of the study and informed consent was collected from each respondent. The name of the study subject not listed on the survey questionnaire and the more personal secret was closed.

Operational definitions

Fertility intention: expectation to have future children

Viral load: the amount of virus in a sample of blood

Undetectable viral loads: HIV-1 RNA < 20 copies/ml or have viral suppression HIV RNA < 150 copies/ml on consecutive measurements every 4 to 6-months

Durable viral suppression: the client's viral load remains undetectable (≤ 200 copies/ml) for at least 6 months after their first undetectable test result.

CHAPTER FOUR

4 RESULT AND DISCUSSION

4.1 Results

4.1.1 Descriptive statistics

Out of 433 reproductive ages PLHIV women who were eligible respondents of the study, 432 agreed to participate in the study, giving a response rate of 99.7%. The larger proportion 138 (31.9%) of the respondents were from Zewditu hospital ARV treatment unit and the smallest number of respondents 18 (4.2 %) were from Trunesh Bejing hospital.

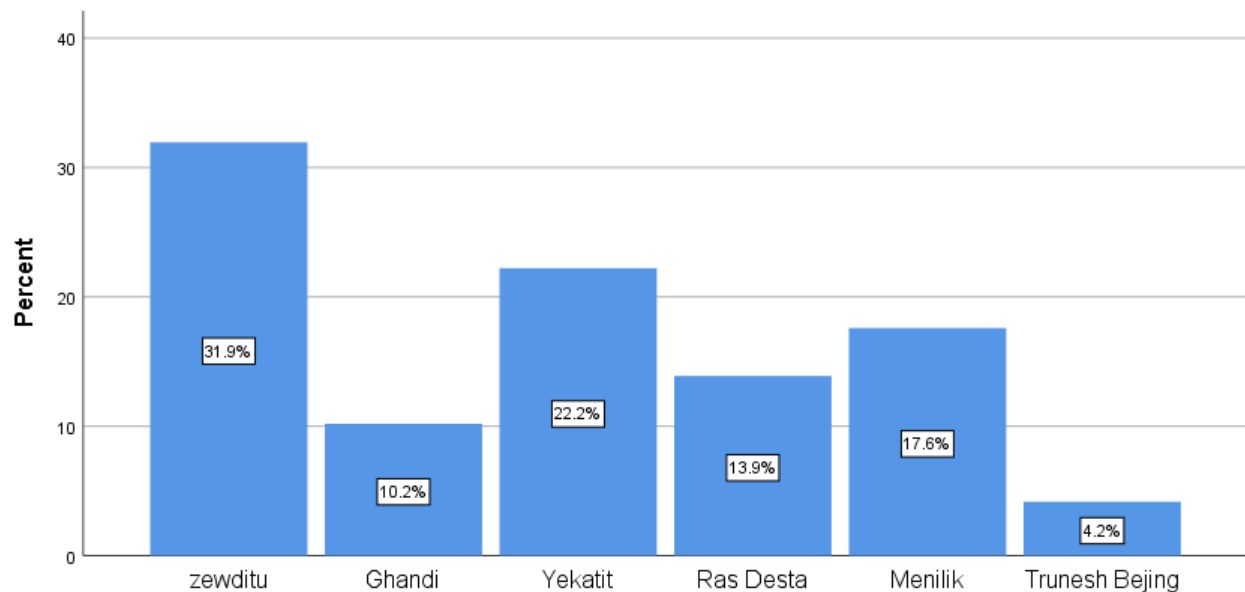


Figure 3 - Percentage distribution of reproductive age PLHIV women have viral load status in selected hospitals Addis Ababa ,Ethiopia, 2022

4.1.1.1 Socio demographic characteristics of the respondents

The analysis include a total of 432 reproductive ages PLHIV women. As shown in table 4. 1, the age the study participants ranged from a minimum of 15 years to a maximum of 49 years. Majority of the PLHIV women were above the age of 34 (75.5 %), in the middle were the age of 25-34 (20.1%) and (4.4%) of the PLHIV women were below 24 years of age. Most of the respondents were married or in relationship 318 (73.6%) while others single 30 (6.9%), separated/divorced 50 (11.6%) and widowed 34 (7.9%). Eighty four (19.4%) of respondents had no formal education, the

majority had at least Primary and secondary education 144 (33.3%), 140 (32.4%), respectively and the rest 60 (14.8%) respondents were above secondary level. Most of the respondents were employed 270 (62.5%) and unemployed 162 (37.5%). Three fourth of participants were house wives 146 (33.85%), government employee 95 (22.0%) and engaged in private business 123 (28.5%). The majority of respondents were Orthodox Christians 332 (76.9 %) by religion. The average monthly income of respondents was 3,383.23 with standard deviation of 2,531.338 in Ethiopian birr.

Table 4.1: Socio-demographic characteristics of respondents, Addis Ababa, six public hospitals (n=432)

Characteristics	n	(%)
Age of the respondent		
Below 24	19	4.4
25-34	87	20.1
Above 34	326	75.5
Marital status of the respondent		
Never-married	30	6.9
Married	318	73.6
Separated or divorced	50	11.6
Widowed	34	7.9
Educational level of the respondent		
No formal education	84	19.4
Primary	144	33.3
Secondary	140	32.4
Above secondary	64	14.8
Employment status of the respondent		
Employed	270	62.5
Not employed	162	37.5
Occupation of the respondent		
House wife	146	33.8
Daily laborer	19	4.4
Merchant	32	7.4
Government employee	95	22.0

Private business	123	28.5
Other	17	3.9
Religion status of the respondent (n=430)		
Orthodox Christian	332	76.9
Muslim	42	9.7
Protestant	56	13.0
Average monthly income of the respondent		
Mean(SD)	3383.23(2531.338)	

4.1.1.2 Fertility intention

The analysis shown in table 4.2, presents fertility intention of the respondents. Eighty eight (20.4%) of the respondents had no child, while 140 (32.4%), 116 (26.9) and 88 (20.4%) had one, two and more children, respectively. One hundred ninety two (44.4%) respondents reported having enough number of children; I don't need more but the rest of the 432 respondents 196 (45.4%) had plan to have a child in the coming 3 years and 236 (54.6%) had not plan. 240 (55.6%) reported having no enough number of children. The majority of respondents in their last pregnancy outcome 323 (74.8%) had live birth, others dead 25 (5.8%), dead during delivery and after delivery and the rest 84 (19.4%) had no child. Three fourth of respondents had decision on pregnancy or contraceptive use 254 (58.8%) jointly with them partner, 133 (30.8%) lonely and 42 (9.3%) by other health practitioner. Total of 432 respondents 196 (45.4%) had intention to have a child and the rest 236 (54.6%) had not intentions. The majority of respondents 120 (27.8%) had intention regardless of their viral load status, their viral load undetectable/low 49 (11.3%) and their partner desire to have a child 19 (4.4%). On the other hand, not have intention to have a child similar to the above reason regardless of their viral load status 114 (26.4%), their viral load detectable/high 49 (11.3%), their partner not desire to have a child 15 (3.5%) and the rest others 59 (13.7%) of respondents were single, divorced or widowed. Two hundred eight (48.1%) respondents use contraceptives and the majority 224 (51.9%) respondents not use contraceptives. Of those who use contraceptive frequently condom, implant, injection, pills and IUD 101 (23.4%), 52 (12.0%), 25 (5.8%), 18 (4.2%), and 12 (2.8%), respectively.

Table 4.2: Percentage distribution of participants' fertility intentions, Addis Ababa, six public hospitals (n=432)

Characteristics	n	(%)
Number of children of the respondent		
No child	88	20.4
One child	140	32.4
Two children	116	26.9
Above two children	88	20.4
Plan to have children in the coming 3 years (wife)		
Yes	196	45.4
No	236	54.6
The number of children I have is enough for me; I don't need more		
Yes	192	44.4
No	240	55.6
Last pregnancy outcome of the respondent (n=349)		
Live birth	323	74.8
Dead	25	5.8
No child	84	19.4
Decision on pregnancy/contraceptive use of the respondent		
I alone	133	30.8
Jointly	254	58.8
Others	42	99.3
Intention to have a child		
Yes	196	45.4
No	236	54.6
Reason to have a child (n=196)		
My viral load is undetectable/low	49	11.3
Regardless of my viral load status	120	27.8
My partner desire to have a child	19	4.4
Other	8	1.9
Reason not to have a child (n=237)		

My viral load is detectable/high	49	11.3
Regardless of my viral load status	114	26.4
My partner not desire to have a child	15	3.5
Other	59	13.7
Contraceptive use of the respondent		
Use	208	48.1
Not Use	224	51.9
Frequently used contraceptives (n=208)		
Pills	18	4.2
IUD	12	2.8
Injections	25	5.8
Implant	52	12.0
Condom	101	23.4

4.1.1.3 HIV viral load status

The results shown in table 4. 3, present fifty three (12.3%) of the respondents were on ART for ≤ 3 years and 379 (87.7%) were for >3 years of duration. Three hundred sixty four (84.3%) respondents had good ART adherence and 68 (15.7%) had poor ART adherence. The viral load status of the respondents 215 (49.8%) had undetectable and 217 (50.2%) had detectable viral load. The majority of respondents in their HIV status disclosure 362 (83.8%) disclosed the result and only 70 (16.2%) not disclosed the result. Of the total respondents, 367 (85.0%) had awareness/knowledge on viral loads and the rest 65 (15.0%) respondents had not awareness/knowledge on viral loads. Two hundred fifty four (58.8%) respondents had HIV positive partner, while 85 (19.7%), 63 (14.6%) and 30 (6.9%) had HIV negative partner, do not know their result and not have partner, respectively. Three fourth respondents had HIV negative child 301 (69.7%), HIV positive child 40 (9.3%) and 91 (21.1%) not have a child.

Table 4.3: HIV related characteristics of respondents, Addis Ababa, six public hospitals (n=432)

Characteristics	n	(%)
Duration on ART(years) of the respondent		
≤ 3 years	53	12.3

>3 years	379	87.7
ART adherence of the respondent		
Good	364	84.3
Poor	68	15.7
Viral load status of respondent		
Undetectable level	215	49.8
Detectable level	217	50.2
HIV status disclosure of the respondents		
Disclosed the result	362	83.8
Not disclosed the result	70	16.2
Awareness/knowledge to viral loads of the respondents		
Yes	367	85.0
No	65	15.0
Partner HIV status		
Positive result	254	58.8
Negative result	85	19.7
Do not have the result	63	14.6
Not have partner	30	6.9
Children HIV status		
Positive result	40	9.3
Negative result	301	69.7
Not have children	91	21.1

4.1.2 Inferential statistics: Relationship between viral load status and fertility intention

The bivariate logistic regression analysis (shown in table 4.4) witnessed that age of the respondent, marital status, educational level, occupation of the respondents, religion, number of children, the number of children I have is enough for me; I don't need more, last pregnancy outcome, decision on pregnancy/contraceptive use, duration on ART (years), partner HIV result, children HIV status, awareness/ knowledge to viral load and average monthly income of the household had significant bivariate association with intention to have a child or fertility intention ($p \leq 0.25$). These variables are further examine in the multi variable logistic regression in Table 4.5.

Table 4.4: Unadjusted odds ratios with 95% confidence intervals for the relationship between viral load status and fertility intention, Addis Ababa, six public hospitals (n=432)

Characteristics	COR	95% CI		P-value
		Lower	Upper	
Age of the respondent				
Below 25	1.357	0.537	3.430	0.519
25-34	2.865	1.747	4.697	0.000 □
Above 34 ^{RC}	-	-	-	-
Marital status of the respondent				
Never-married	6.103	1.952	19.075	0.002 □
Married	4.667	1.881	11.579	0.001 □
Separated or divorced	1.815	0.619	5.325	0.278
Widowed ^{RC}	-	-	-	-
Educational level of the respondent				
No formal education	0.465	0.239	0.905	0.024 □
Primary	0.706	0.391	1.274	0.248 □
Secondary	0.857	0.474	1.550	0.611
Above secondary ^{RC}	-	-	-	-
Employment status of the respondent				
Employed	1.062	0.718	1.570	0.765
Not Employed ⁻	-	-	-	-
Occupation of the respondents				
House wife	0.578	0.208	1.601	0.291
Daily laborer	0.408	0.107	1.563	0.191 □
Merchant	1.540	0.454	5.223	0.488
Government employee	0.447	0.456	1.276	0.132 □
Private business	0.548	0.196	1.534	0.252
Unemployed ^{RC}	-	-	-	-
Religion status of the respondent				
Orthodox Christian	0.873	0.495	1.541	0.640
Muslim	1.875	0.830	4.234	0.130 □
Other ^{RC}	-	-	-	-

Number of children of the respondent				
No child	11.803	5.794	24.043	0.000 □
One child	5.569	2.977	10.416	0.000 □
Two child	1.732	0.892	3.361	0.105 □
Above two children ^{RC}	-	-	-	-
The number of children I have is enough for me; I don't need more				
Yes	0.008	0.004	0.020	0.000 □
No ^{RC}	-	-	-	-
Last pregnancy outcome of the respondent				
Live birth	0.189	0.110	0.326	0.000 □
Dead	0.593	0.228	1.539	0.283
Not have a child ^{RC}	-	-	-	-
Decision on pregnancy/contraceptive use of the respondent				
I alone	0.360	0.176	0.733	0.005 □
Jointly	0.638	0.329	1.240	0.185 □
Others ^{RC}	-	-	-	-
Contraceptive use of the respondent				
Yes	1.145	0.784	1.674	0.483
No ^{RC}	-	-	-	-
Duration on ART (years) of the respondent				
≤ 3 years	1.407	0.791	2.503	0.246 □
> 3 years ^{RC}	-	-	-	-
ART adherence of the respondent				
Good	1.224	0.724	2.070	0.450
Poor ^{RC}	-	-	-	-
HIV status disclosure of the respondent				
Disclosed the result	0.748	0.448	1.249	0.267
Not disclosed the result ^{RC}	-	-	-	-
Viral load status of the respondent				
Undetectable level	0.844	0.577	1.233	0.380
Detectable level ^{RC}	-	-	-	-
Partner HIV Status				
Positive result	0.728	0.341	1.553	0.411

Negative result	1.656	0.715	3.834	0.239 □
Do not know the result	0.500	0.206	1.214	0.126 □
No partner ^{RC}	-	-	-	-
Children HIV Status				
Positive result	0.458	0.209	1.003	0.051 □
Negative result	0.181	0.107	0.307	0.000 □
Do not have children ^{RC}	-	-	-	-
Awareness/knowledge to viral loads of the respondent				
Yes	1.396	0.813	2.396	0.226 □
No ^{RC}	-	-	-	-
Average monthly income of the household	0.831	0.687	1.004	0.055 □

RC= Reference Category

□ =(P ≤ 0.25) significant

The results of multiple logistic regression analysis (shown in table 7) presents the relationship between viral load status and fertility intentions of HIV positive reproductive ages, controlling for all other variables in the model. It is seen that, the likelihood of having fertility intention was 2.71 times higher among women of age 25-34 compared to the reference category (95% CI: 1.005-7.339). Married women were 6.06 times more likely to have fertility intention compared to widowed (95% CI: 1.12-32.7). The result shows inverse association between educational status and fertility intention of the respondents. The chance of having fertility intention decreases for women with no formal education and primary by 95.1% and 83.9%, respectively (AOR = 0.049; 95% CI: 0.010-0.252 & AOR = 0.161; 95% CI: 0.039-0.662) compared to those with secondary and above level of education. The likelihood of having fertility intention significantly decreased by 99.7% (AOR=0.003; 95% CI: 0.001-0.011) for women who believed they already have enough number of children. The likelihood of having fertility intention significantly decreased by 71.5% (AOR =0.285; 95% CI: 0.078-1.039) for women who made decision alone. Women with partners having positive and negative results were 5.63 (AOR = 5.631; 95% CI: 0.846-37.484) and 19.28 (AOR = 19.385; 95% CI: 2.533-148.326) times more likely to have fertility intention, respectively, compared to those with no knowledge of their HIV status. There was no significant association between the viral load status of the respondent and fertility intention (P>0.05).

Table 4.5: Adjusted odds ratios with 95% confidence intervals for the relationship between viral load status and fertility intention, Addis Ababa, six public hospitals (n=432)

	Fertility Intention					95% CI		
Characteristics	Yes	No	COR	P-value	AOR	Lower	Upper	P-value
Viral load status of the respondent								
Undetectable level	93	122	1		0.949	0.453	1.991	0.890
Detectable level	103	114	0.844	0.380	1			
Age of the respondent								
Below 24	9	10	1		0.253	1.061	7.369	0.136 □
25-34	57	30	1.357	0.519	2.716	1.005	7.339	0.049
Above 34 ^{RC}	130	196	2.865	0.000 □ □	1			
Marital status of the respondent								
Never-married	17	13	1		6.078	0.537	68.788	0.145
Married	159	159	6.103	0.002 □ □	6.066	1.124	32.729	0.036 □
Separated or divorced	14	36	4.667	0.001 □ □	1.837	0.279	12.078	0.527
Widowed ^{RC}	6	28	1.815	0.278	1			
Educational level of the respondent								
No formal education	29	55	1		0.049	0.010	0.252	0.000 □
Primary	64	80	0.465	0.024 □	0.161	0.039	0.662	0.011 □
Secondary	69	71	0.706	0.248 □	0.366	0.098	1.371	0.136
Above secondary ^{RC}	34	30	0.857	0.611	1			
Occupation of respondent								
House wife	66	80	1		1.274	0.170	9.525	0.814
Daily laborer	7	12	0.578	0.291	0.331	0.035	3.090	0.332
Merchant	22	10	0.408	0.191 □	6.424	0.540	76.437	0.141
Government Employee	37	58	1.540	0.488	0.970	0.125	7.523	0.976
Private business	54	69	0.447	0.132 □	0.672	0.102	4.429	0.679
Other ^{RC}	10	7	0.548	0.252	1			

Religion status of the respondent								
Orthodox Christian	143	189	1		0.314	0.090	1.097	0.070
Muslim	26	16	0.873	0.640	1.384	0.206	9.313	0.738
Protestant ^{RC}	26	30	1.875	0.130	1			
Number of children of the respondent								
No child	65	23	1		2.752	0.602	12.574	0.192
One child	80	60	11.803	0.000 □ □	2.147	0.574	8.026	0.256
Two child	34	82	5.569	0.000 □ □	1.037	0.251	4.276	0.960
Above two children ^{RC}	17	71	1.732	0.105 □	1			
The number of children I have is enough for me; I don't need more								
Yes	6	186	1		0.003	0.001	0.011	0.000 □ □
No ^{RC}	190	50	0.008	0.000 □ □				
Decision on pregnancy/contraceptive use of the respondent								
I alone	46	87	1		0.285	0.078	1.039	0.057
Jointly	123	131	0.360	0.005 □ □	0.351	0.083	1.479	0.154
Others ^{RC}	25	17	0.638	0.185 □	1			
Duration on ART(years) of the respondent								
≤ 3 years	28	25	1		1.248	0.388	4.019	0.710
> 3 years ^{RC}	168	211	1.407	0.246 □	1			
Partner HIV status								
Positive result	107	147	1		5.631	0.846	37.484	0.074
Negative result	53	32	0.728	0.411	19.385	2.533	148.326	0.004 □
Do not Know the result	21	42	1.656	0.239 □	4.869	0.740	32.030	0.100
Not have partner ^{RC}	15	15	0.500	0.126 □	1			
Awareness/knowledge to viral loads of the respondent								
Yes	171	196	1		0.784	0.273	2.248	0.650
No ^{RC}	25	40	1.396	0.226 □	1			

RC=Reference Category

- =(P < 0.05) significant
- □ =(P < 0.01) significant

4.2 Discussion

This study has primarily sought to examine the relationship between viral load status and fertility intention women of PLHIV on ART treatment in the reproductive age group, drawn from six hospitals of Addis Ababa. Of the total respondents one hundred ninety six (45.4%) of them had fertility intention and the rest two hundred thirty six (54.6%) had not fertility intention whether their viral load status is undetectable or detectable. The finding revealed that being HIV positive has no significant effect on one's desired to fertility. The fertility intention computed from the present study is higher compared to previous studies conducted in western Ethiopia which was found 42.1% having intention (Sufa, et al., 2014). The figure is also comparable with systematic review and meta-analysis conducted in China (42.04%) (Yan, et al., 2021) and in Rwanda (40.7%) (Niragire, et al., 2021).

The results of the multivariable logistic regression analysis showed significant association between age of the respondents and fertility intention. The findings of meta-analysis conducted in China showed that age of women was a key predictors of fertility intention. However, this study used different methodologies and population (Yan, et al., 2021). A case control study commissioned by Jimma University, Ethiopia, showed that most women aged 25-34 years had fertility desire (Shifera, et al., 2020). Similar studies conducted in Tigray region, further witnessed that 52.8% in younger age had higher fertility desire compared to older women (Adamu, et al., 2014). Perhaps it's time to start a new life and replace their children at this age. Women over 35 may already have children, which could diminish their enthusiasm in getting pregnant.

Interestingly, women with no formal education and primary level of education had lower likelihood to have fertility intention compared to those in secondary and above level. This could be mainly due to the fact that better educated people have increasingly greater access to information (Yan, et al., 2021). A systematic review and meta-analysis in Ethiopia showed that educated peoples have better decision making than individuals with no formal education. Another study conducted in Jimma, Ethiopia, reported strong significant association between educational and fertility desire, suggesting that women who had no education were less likely to have fertility intentions compared to their counterparts (Sufa, et al., 2014). It may be true that no educated mother can have well-

organized knowledge about reproduction, and this may lead to anxiety and stigmatization of women who are HIV positive.

Partner HIV status significant with fertility intention the other study in the United State revealed that among sexually active women who desire a child in the future, 73% (67/92) reported a partner with a negative or unknown HIV status result (Kessler, et al., 2009). The husband HIV status may be related to current practice furthermore, to avoid mother-to-child transmission, it may be helpful to know partner's HIV status.

In this study the characteristics the number of children I have is enough for me; I don't need more significant with fertility intention the women may have enough children no intention.

One of the key finding of the study is that viral load status had no significant association with fertility intention of the respondent. Put it differently, there were no significant difference in fertility intention between those having undetectable and detectable viral load status. The finding concurs with previous studies carried out in Canada which include that viral load status and other clinical indicators did not achieve statistical significance between women who intended to have children and those who did not (Gina, et al., 2007). This may be due to the possibility of intermittent changes in viral load status and other indicators.

While there could be some variations in the methodology used, the very few available evidences in Africa context suggest very weak or no association between knowledge of viral load status and fertility preferences. Given ART provision and viral load status determination is a recent phenomenon in Ethiopia, the extent to which a person's HIV status influences women's fertility desires is not well understood (Yeatman, 2009). A systematic review conducted in Ethiopia indicated that initiating ART and improved health status didn't increase the fertility desire of PLHIV (Mosisa, et al., 2020). A longitudinal study conducted among 255 HIV-positive Kenyan women (between October 2012 and December 2015) clearly indicated that fertility desire was not associated with detectable viral load in the unadjusted model, or after adjusting for age and education level (Wilson, et al., 2018). On the other hand, qualitative studies from Zambia found that female respondents who did not know their HIV status saw no clear relationship between HIV and fertility (Baylies, 2000). Cooper and her colleagues interviewed 60 HIV-positive men and women in Cape Town about their fertility desires and intentions and concluded that the desire to have children remained strong despite their infection and load status (Cooper D. , et al., 2007). Studies in Africa generally found that the considerable cultural, economic, and social importance of

childbearing in most of sub-Saharan Africa, particularly in rural areas, are still driving forces for continued fertility regardless of HIV/AIDS status (Setel, 1995). HIV-positive women continued to want more children (Rutenberg, et al., 2006). A study conducted in Côte d'Ivoire reported that the desire to have children surpassed health concerns even among HIV-positive women who knew their HIV-status (Aka-Dago-Akribi, et al., 1999).

CHAPTER FIVE

5 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The overall finding of the study suggest that a high proportion of HIV-positive reproductive age's women desire to conceive. However, the finding witnessed that there was no significant association between viral load status and fertility intention. Beside that there was no fertility differentials between women who have undetectable and detectable viral loads. A high proportion of women have good ART adherence. Age, marital status, educational level, having enough number of children, decision on pregnancy/family planning utilization and partner HIV status were found to be key predictor of fertility intention among women of PLHIV on ART treatment.

5.2 Recommendation

The study targeted only women of reproductive age group, and was not a truly representative of all groups of HIV positive women. This, calls for future studies to consider other groups of women to better understand the relationship between viral load status and fertility intention. Inclusion of rigorous qualitative data would also help deepen our understanding of fertility intention among PLHIV women. Finally, the findings of the study strongly implicate the need for strengthening and proper implementation of the various health policies and guidelines pertaining to HIV/AIDS for increased uptake of reproduction health services by PLHIV women. Furthermore, reached young women including those sexually active with care, treatment and counseling services. Create demand and awareness about HIV and disseminating HIV related concepts by social behavioral change communication modality. The government and other stakeholders should work on the area of HIV prevention, testing and treatment services.

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APPENDIXES
ADDIS ABABA UNIVERSITY
COLLEGE OF DEVELOPMENTAL STUDY
CENTER OF POPULATION STUDIES

Questionnaire

Identification

Hospital name _____

Interviewer's visit

Interviewer Card Number _____

Interviewer Phone number _____

Time taken to complete _____

Result

- Completed _____
- Refused _____
- Other (Specify) _____

Data Collector

Name _____

Date _____

Signature _____

CONSENT

Information sheet

Instruction; Read the statement to the respondents

Greeting.

My name is Hirut Alemayehu I am working a research, which will be conducted by Addis Ababa University College of developmental study center of population studies. The main purpose of this study is to assess the relationship between viral load status and fertility intentions of HIV positive reproductive age women. This short rapid assessment tool contains questions related to practice and responses, perception and views in fertility intentions. The survey primarily targeted HIV positive reproductive age women who have viral load status from selected public hospitals who will be randomly selected. The data will be used for research purpose only and that will bring evidence based policy making, strengthen advocacy and be beneficial to a wide range of stakeholders. Participation in this study is voluntary, and if you should come to any question you don't want to answer, you can go to the next question; we hope you will participate in the study since your views are important. The interview takes 20 - 30 minutes. No identifying information will be included, confidentiality information will be assured & will not be passed to a third party without your knowledge and consent.

May I continue the interview?

Yes_____

No_____

At this time, do you want to ask me anything about the survey?

Appendix I: English questionnaires version

Checklists of socio demographic characteristics, clinical, behavioral factors and fertility information of HIV positive reproductive age women.

Data obtained from client cards and smart care data base

No	Questions	Findings	Skip
1	Age of women	_____	
2	Marital Status	1. Never-married 2. Married 3. Separated or divorced 4. Widowed	
3	Educational status	1. Not read or write 2. Read or write 3. No formal education 4. Primary 5. Secondary 6. Technical/vocational 7. College/University	
4	Employment status	Employed.....1 Unemployed.....2	
5	Type of work	1. House wife 2. Daily laborer 3. Merchant 4. Government employee 5. Private business 6. Other (specify).....	
6	Start Date of ART	_____	
7	Duration on ART (years)	_____	
8	ART adherence	1. Good 2. Fair 3. Poor	
9	Viral load	1. Undetectable level (≤ 150 copies/mL) 2. Detectable level (> 150 copies/mL)	
10	Partners HIV status	1. Positive result 2. Negative result 3. Do not know the result 4. Not have partner	

11	Children HIV status	1. Positive result 2. Negative result 3. Do not know the result	
12	HIV status disclosure	1. Disclosed the result 2. Not disclosed the result	

Data obtained directly by interviewing HIV positive women of reproductive age related to fertility information

No	Questions	Findings	Skip
1	What is your religion?	1. Orthodox.....1 2. Muslim.....2 3. Protestant.....3 4. Other.....4	
2	What is the average monthly income of your household?	_____	
3	How many Children do you have?	_____	
4	Do you [wife] want or have a plan to have a child in the coming three years?	Yes.....1 No.....2	
5	Does your husband want or have a plan to have a child in the coming three years?	Yes.....1 No.....2	
6	Do you think the number of children you have is enough for you; you don't need more?	Yes.....1 No.....2	Q.3 Answer No
7	If you intend to have a child?	Yes.....1 No.....2	Q.3 Answer No
8	What is the reason intend to have a child?	My viral loads is undetectable/low.....1 I need more children regardless of my Viral load status.....2 My partner desires additional child.....3 Other.....4	Q.3 Answer No
9	What is the reason intend to not have a child	My viral loads is detectable/high.....1 I need more children regardless of my viral load status.....2	

		My partner not desires additional child...3 Other.....4	
10	What was the outcome of your last pregnancy?	Live birth.....1 Still birth.....2 Abortion.....3 Dead after birth.....4	Q.3 Answer No
11	Do you use any contraceptives (or at least one)?	Yes.....1 No.....2	
12	Which of the following do you frequently use?	Pill.....1 IUD.....2 Injections.....3 Implants.....4 Condom.....5 Calendar.....6 Withdrawal.....7 Others (specify).....8	Q.11 Answer No
13	Who usually decides on pregnancy or contraceptive use?	I alone.....1 Jointly.....2 Together.....3 Other.....4	
14	Do you have Knowledge/ Awareness to Viral loads	Yes.....1 No.....2	
15	Why you have not Knowledge/ Awareness to Viral loads	No one tell me.....1 No opportunity.....2 Not giving attention.....3 Other.....4	

Closing: Those are all our questions for now. Do you have anything that you would like to add, or do you have any questions for us?

THANK YOU FOR YOUR COOPERATION.

አዲስ አበባ ዩኒቨርሲቲ

የሀገር ልማት ኮሌጅ

ስነ ህዝብ ጥናት (ስነ -ተዋለዶ) ትምህርት ቤት

ስለ ጥናቱ አጠቃላይ መረጃ

መላያ

የሆስፒታል ስም _____

የመረጃ ሰጪ

የመረጃው ሰጪ ክርድ ቁጥር _____

የመረጃው ሰጪ ስልክ ቁጥር _____

መረጃውን ለመጣት የወሰደው ደቂቃ _____

ወጠቱ

• መረጃው የተሞላ _____

• መረጃው ያልተሞላ _____

መረጃውን የሰበሰበው

ስም _____

ቀን _____

ፊርማ _____

መረጃ መሳጫ

ለመረጃ ስጪውያን ብብላቸው

ሰላምታ

ስሜሂሩት ዓለማዊ ሁኔታዎችን ይባላል፡፡ የአዲስ አበባ ዩኒቨርሲቲ የሀገር ልማት ኮሌጅ ስነ ህዝብ ጥናት (ስነ-ተዋልዶ) ትምህርት ቤት ለመጽሐፍ ዘመናዊ ጥናት መረጃ በመሰብሰብ ላይ ነች፡፡ የጥናቱ ዓላማዎች አይሺ በደሞክራሲያዊ መንግሥት በመሰላዊት የእድሜ ክልል የሚገኙ ሴቶች ልጅ ለመሰላዊት የቫይረስ መጠፍቻው ያለውን አስተዋፅኦ ወይም ተፅዕኖ ለማጥናት ሲሆን የሴቶችን ልምድ፣ ምላሽ፣ አመለካከት እና እይታ ላይ ያተኮረ ነው፡፡ ጥናቱም በተመራጡ ሆስፒታሎች ወሰን የሚገኙ ቫይረሱ በደሞክራሲያዊ መንግሥት በመሰላዊት እድሜ ክልል የሚገኙ እና የቫይረስ መጠፍቻው የሚታወቅ ሴቶችን የማይሳትፍ ነው፡፡ የሚሰጠው መረጃም ለፖሊሲ አወጫጅ፣ ለተጠቃሚዎች እና ለተለያዩ ባለድርሻ አካላት ፕሮግራም ለመቅረፅ፣ ግንዛቤ ለመስጠት እና የአገልግሎት ተጠቃሚ ትንሹ ሚስፋፋ ያደርጋል፡፡ መጠይቁ ከ 20-30 ደቂቃ ይፈጃል፡፡ ይህን ዓላማ እውን ለማድረግ እርስዎ በፍቃደኝነት ላይ የተመራተ ትብብር እንዲያረጉልኝ በትህትና እጠይቃለሁ፡፡ በመጠይቁ ወቅት መመለስ የማይፈልጉት ጥያቄ ካለ በግልፅ መናገር ይችላሉ፡፡ ግን የሚሰጠው መረጃ ለጥናቱ እጅግ ከፍተኛ የሆነ ጠቀሜታ ይኖረዋል፡፡ በመጠይቁ ወቅት የእርሶን ስምምሆን ማግኘት ሊገልፅ የሚችል ነገር አይጻፍም፡፡ ለጥያቄዎቹ የሚሰጠው ምላሽ ያለ እርስዎ ፍቃድ ለሶስተኛ ወገን ተላልፎ አይሰጥም፡፡ እርስዎ ለሚሰጠው መረጃ መላ በመላ በሚሰጥር እንደሚሆን ላረጋግጥልዎ እወዳለሁ፡፡ ጥናቱን በተመለከተ ተጨማሪ መረጃ ቢያስፈልግዎ ወይም ጥያቄ ካልዎት ለጥናት አድራጊዋ ሂሩት ዓለማዊ ሁኔታዎች በስልክ ቁጥር +251 913247092 መግኘት ይችላሉ፡፡

በመጠይቁ ለመሳተፍ ፈቃደኛ ነዎት

1. አዎ
2. አይደለም

II. የአሜሪካ ቃለ መጠይቅ

በተመረጡ ሆስፒታሎች ወስጥ የሚኖሩ አይሺ በደማቸው የሚሻባቸው፤ በመሰለድ የእድሜ ክልል የሚኖሩ እና የቫይረስ ማጠናቸው የሚታወቅ ሴቶችን በማህበራዊ፤ በኢኮኖሚያዊ እና በወልደት ወይም በአወላለድ ተዛማጅ ጉዳዮች ዙሪያ የሚደረግ ቃለ መጠይቅ ነው።

1ኛው መረጃው ቀጥታ ከካርድ እና ከመረጃ ቋት የሚጠበቅ ነው

2ኛው መረጃው ቀጥታ በመሰለድ እድሜ የሚኖሩ የቫይረሱ በደማቸው የሚሻ ሴቶችን በመጠየቅ የሚጠበቅ ነው

ተ.ቁ	ጥያቄ	ምሳሌ	ይዘት
1	የምን እምነት ተከታይ ነዎት?	ኦርቶዶክስ 1 ሙስሊም2 ፕሮቴስታንት3 ሌላ ካለ ይገለፅ4	
2	የቤተሰብዎ ገቢ በወር በአማካይ ምን ያህል ብር ነው?	_____	
3	ስንት ልጆች አልዎት?	_____	
4	በሚቃጠሉት 3 ዓመታት ወስጥ ልጅ ለመሰለድ ፍላጎት ወይም እቅድ አለዎት (ሚስት)?	አዎ1 የለኝም2	
5	በሚቃጠሉት 3 ዓመታት ወስጥ ባለቤትዎ ልጅ ለመሰለድ ፍላጎት ወይም እቅድ አላቸው?	አዎ1 የላቸውም2	
6	አሁን ያልዎት ልጆች በቂ ናቸው ብለው ያስባሉ ወይስ ሌላ ማጠቃለያ ያስባሉ?	አዎ1 የለኝም2	ጥያቄ 3 መልሱ ምንም ከሆነ
7	ልጅ ለመሰለድ ይፈልጋሉ?	አዎ1 አልፈልግም2	ጥያቄ 3 መልሱ ምንም ከሆነ
8	ልጅ ለመሰለድ የሚፈልጉበት ምክንያት	የቫይረስ ማጠና ወደ የማይታይ ደረጃ ስለደረሰ/ዝቅተኛ ስለሆነ1 ተጨማሪ ልጅ የሚፈልጉት እንደ ቫይረሱ ማጠን ወይም ደረጃን በማየት2 ባለቤቶች ሌላ ተጨማሪ ልጅ ስለሚፈልጉ3	ጥያቄ 3 መልሱ ምንም ከሆነ

		ሌላ ምላሽ ካለ ይገለፅ4	
9	ልጅ ለመሰላድ የሚፈልጉበት ምክንያት	የቫይረስ መዝገብ የሚታይ ደረጃ ላይ/ከፍተኛ ስለሆነ1 ተጨማሪ ልጅ የሚፈልጉት እንደ ቫይረሱ መዝገብ ወይም ደረጃን በማየት.....2 ባለቤቶች ሌላ ተጨማሪ ልጅ ስለማይፈልጉ...3	
10	የመጨረሻው የአወላለድዎች ሁኔታ እንዴት ነበር?	በህይወት ያለ ልጅ.....1 በህይወት የሌለ ልጅ2 ወርጃ.....3 ከተወለደ በኋላ የሞተ ልጅ.....4	ጥያቄ 3 መልሱ ምንም ከሆነ
11	አሁን ጥናቱ በሚካሄድበት ወቅት የእርግዝና መከላከያ ይጠቀማሉ (በደንስ አንዱን)?	አዎ.....1 አልጠቀም.....2	
12	አዘወትረው የሚጠቀሙት የእርግዝና መከላከያ የቱነው?	አንክብል.....1 በማህፀን የሚቃወሙ.....2 በመረፊያ የሚገኙ.....3 በክንድ የሚቃበር.....4 ኮንዶም.....5 ቀናቶችን በመለየት.....6 በማቋረጥ.....7 ልላ ካለ (ይጠቀስ).....8	ጥያቄ 11 መልሱ አልጠቀም ከሆነ
13	ነፍሰጠፎ መሆን ሲያስቡ ወይም የእርግዝና መከላከያ መድኃኒት ሲጠቀሙ የሚወስነው ምን ነው?	እኔ ብቻዬን1 ባለቤቴ ብቻወን2 አብረን3 ሌላ ካለ ይገለፅ4	
14	ስለ ቫይረስ መዝገብ ወይም ቫይረሱ ስድ ግንዛቤ/መረጃ አለዎት?	አዎ.....1 የለኝም.....2	
15	ጥያቄ 13 መልሱ የለኝም ከሆነ ስለ ቫይረስ መዝገብ ግንዛቤ/መረጃ የሌሎት	ማንም ስላልነገረኝ.....1 መረጃወን የማይችሉት አጋጣሚ	

	ምክንያት	ስላላገኘሁኝ..... 2 ስለመረጃውትኩረት ስላልሰጠሁኝ.....3 ሌላ ካለ ይገለፅ.....4	
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የነበሩኝ መጠይቆች እነዚህ ናቸውሌላ የሚገኝ ሰት ሃሳብ አለ?

ስለ ቃለ መጠይቁ እና ስለ ትብብርዎ አመሰግናለሁ