ASSESSMENT OF FACTORS ASSOCIATED WITH UNSUPPRESSED HIV VIRAL LOAD AMONG PEOPLE LIVING WITH HIV.

A CASE OF NYARUGURU DISTRICT, RWANDA, FROM JULY 2016 TO JUNE 2017.

by:

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A dissertation submitted to the University of Rwanda in partial fulfillment of the requirement of the degree of Master of Science in Field Epidemiology and Laboratory Management

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DECLARATION

I, François HAKIZAYEZU, declare that this thesis is my original work with the exception of references cited in this book. It has not been submitted either wholly or partially to any university, college or institution for any award.

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ABSTRACT

Introduction

By the end of 2015, nearly 37 million people were living with HIV and 46.3% were on antiretroviral therapy. From the 90-90-90 strategy, by 2020 at a global level, 90% of all people living with HIV who will be on antiretroviral will suppress viral load. Viral load suppression protects the immune system and prevents HIV transmission at a high level. Studies have shown that people living with HIV have near normal life expectancy assuming they suppressed their viral load. Rwanda counts 3% of HIV prevalence and 9% of unsuppressed people. The aim of this study is to assess factors associated with unsuppressed HIV viral load among people living with HIV in Nyaruguru district.

Methods

A cross-sectional study was carried out in Nyaruguru district and involving 637 participants. Data were collected using questionnaire and medical files review. The analysis was done using STATA. P values and odd ratio at 95% confidence interval and 5% of margin error will be used to identify significant variables and factors associated with unsuppressed HIV viral load.

Results

More than half of the study participants were female (Female: 57.77% and Males: 42.23%). The prevalence of unsuppressed HIV viral load in Nyaruguru district was found to be8.9%. Further, 88.7% declared being satisfied with the service that they receive. Male gender was associated with unsuppressed HIV viral load [Adjusted Odds Ratio [aOR = 3.02, P = 0.020]; history of clinical failure [aOR = 3.14, P =0.034], history of treatment interruption [aOR= 8.29, P = 0.002] and perception toward the whole life treatment [aOR = 4.32, P = 0.049] were other three factors associated with unsuppressed HIV viral load.

Conclusion

Efforts to reduce transmission rate by treating HIV to suppress viral load are in place. However, among interviewed patients, 83.8% had a good treatment adherence. Some of identified factors that are associated with unsuppressed HIV viral load include being a male person, the treatment interruption, bad perception toward the whole life treatment, the clinical failure and the health providers' confidentiality. Therefore, putting more efforts on patients counseling on HIV will improve their knowledge adherence then, suppression. Further, improve the adherence and quality of service will help in having suppressed viral load.

Recommendation

The supervision from upper to lower level and IEC to people living with HIV are recommended to improve adherence and suppression rate.

Keywords: unsuppressed, HIV/AIDS, adherence, antiretroviral**,** suppression

DEDICATION

I dedicate this book to my wife. Dr. Omolo Jared, Nyirahabimana Jeannette, and Kinani Peace, this book is dedicated to you for your daily advices and encouragement. It is also dedicated to my two sons Lucky Himbaza Germain and Ineza Eden Gaél; you have been patient during my absence at home due to studies.

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ACRONYMS

AIDS: Acquired immune deficiency syndrome

ARV: Antiretroviral

CD4: Cluster of Differentiation 4

DH: District Hospital

HC: Health Center

HIV: Human Immune Deficiency Virus

IRB: Institutional Review Board

OR: Odd Ratio

RNA: Ribo Nucleic Acid

STI: Sexual Transmitted Infection

WHO: World Health Organization

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CHAPTER I. INTRODUCTION

I.1 Background

At the end of 2015, 36.7 millions of people globally, were living with HIV. Among them, 2.1 millions were new infected cases on annual basis. In that period, the antiretroviral coverage was 46.3% among all HIV infected person(1,2). The number of people accessing treatment increased with time as one of transmission prevention measures and around 18.2 millions HIV infected people were on antiretroviral in 2016 worldwide. Compared to people that had access to treatment in 2010 and 2015 (7.5 million and 15.8 million respectively), the number kept increasing (2).In 2015, the regions in the world most affected by HIV were the Eastern and the Southern Africa. All ages considered, sub-Saharan Africa was counting around 70% on itself(2–5).

Efforts were combined to decrease new infection and increase well-being of HIV infected person. Despite those measures such as "test and treat", sensitization on male circumcision, condom use and the increase patients access on ARVs, the viral load monitoring on regular basis for people living with HIV is crucial for early reaction to non-suppressing HIV infected person(2,3,6). The early action aims to get an undetectable or suppressed viral load that at the end will result into the decrease of the HIV transmission as shown in previous studies.

There is an increase in number in people accessing anti-retroviral therapy not only to improve the life of infected person but importantly to minimize the transmission of HIV to non-infected persons. Therefore, monitoring treatment success remains the gold standard for the viral load testing and control(7).Further, unsuppressed viral load predict that either drugs are not taken correctly or there is a resistance somewhere(6).

The target 90-90-90 set by the Joint United Nations Program on HIV/AIDS in 2014 says that by 2020, 90% of people living with HIV will be aware of their status, 90% of them, will access treatment and 90% of them will be having HIV suppressed viral load (6).Moreover, the viral load monitoring coverage in 2014 was only 50%. This low coverage was due to the test cost, the availability of trained staff and limited sites due to the complexity of the testing procedures. This gap in viral load monitoring was challenging clinicians in decision making on what to do for HIV infected people when on follow-up(7,8).

A multi-country study conducted by Medicines San Frontiers evidenced that 30% of people to whom treatment failure was suspected, were having elevated viral load, which means that 70% might have been unnecessarily switched to the second-line regimes if no viral load test was done to confirm the treatment failure(6,9).

Even if viral load testing has been important in following up people living with HIV, above highlighted challenges have been identified worldwide in this strategy to the extent that it becomes difficult to early determine whether a person is suppressing or not where challenges are still being faced (10–12).

Studies have shown that people living with HIV have almost normal life expectancy when suppressing their viral load(13). The prevalence of HIV in Rwanda is around 3% across the country. Females are most at risk compared to males (HIV prevalence in females: 3.7% and in Males: 2.2%). Additionally, while 83% of Rwandan people live in rural zone, HIV is most prevalent in urban setting(7.1%) compared to rural setting(2.3%)(14–16).

The viral load suppression rate among people living with HIV in Rwanda has been estimated to be 9%(17,18). While unsuppressed HIV viral load is defined as having more than 200 copies of HIV nucleic acids per milliliter of blood at list after one year of treatment(19), some people still having unsuppressed HIV viral load in Nyaruguru and up to now, no study assessed factors associated with unsuppressed HIV viral load among people living with HIV in Nyaruguru district.

I.2. Problem statement

Studies have been conducted in Vietnam to evaluate the prevalence of unsuppressed HIV viral load and its predictors, it has been seen that 93% patients were suppressing, this was linked to the sustainability and uninterrupted ARV treatment during the first year of treatment (20). The similar study was done in South Africa and aimed in assessing factors, which may be associated with recent unsuppressed HIV1 viral load when patients are on the first line treatment. After the data analysis, they found that 85% of patients were suppressing after six months of treatment (21). Some factors have been found to be associated with unsuppressed HIV viral load in these two studies such as: intake of alcohol in first month of treatment initiation, pregnancy, mental health status, substance

abuse, weak social support, depression, medication side effects, prior ART exposure(20,21). This was also found in population based survey done in Kenya(22).

In Rwanda, even if 91% of people living with HIV are having suppressed viral load, some factors still affecting the viral load suppression so that the whole country remains with 9% of unsuppressed clients. Some of these factors were low community based support mainly in adolescents, co infection, poor nutrition, social stigma and mismanagement of opportunistic infection, poor quality of the service in term of waiting time and service delivery and irregularity in adherence. Facing these factors, some interventions were done by the government Rwanda in collaboration with partners such as implementation of treat all strategy, improving the quality of the service, counseling adherence to people living with HIV, nutrition support as well as the diagnosis of opportunistic infections. In addition to this, clinical, biological and immunological assessment is done to have an idea on the general status of the new enrolled patients so that if any health problem is identified, the intervention is early done. For adolescents, emphasizing on adolescents follow up through "All In" initiative was also done. In term of staffing, the Ministry of health has initiated clinical mentors at all district hospitals to monitor patients care in the catchment area(17,18).

Despite all efforts put in HIV management in Rwanda, unsuppressed HIV viral load is still seen across the country and in Nyaruguru in particular. The target in initiating antiretroviral therapy for people living with HIV is to suppress their viral load. However, there is no study that assessed the factors associated with unsuppressed HIV viral load in Nyaruguru district of Rwanda. This is the reason why we are carrying out this study.

I.3. Study objectives

General objective

Assessing factors associated with unsuppressed HIV viral load among people living with HIV in Nyaruguru district from July 2017 to June 2018.

Specific objectives

- Estimate the prevalence of unsuppressed HIV viral load among people living with HIVin Nyaruguru district
- Measure the patient satisfaction on HIV service delivery among people living with HIVinNyaruguru district

- Identify factors associated with unsuppressed HIV viral load among people living with HIV in Nyaruguru district

I.4. Research questions

- What is the prevalence of unsuppressed HIV viral load among people living with HIV in Nyaruguru district?
- What is the proportion of patients satisfied with HIV services that people living with HIV receive?
- What are factors associated with unsuppressed HIV viral load among people living with HIV in Nyaruguru district?

1.5. Study significance

The purpose of this study was to determine the factors associated with unsuppressed HIV viral load among people living with HIV under antiretroviral treatment in Nyaruguru district. The study significance was to contribute to the improvement of viral load suppression rate among people living with HIV in Nyaruguru district through improving quality of the service and patients behavior change by highlighting factors associated with unsuppressed HIV viral load.

I.6. Organization of the thesis

This thesis is dived into six chapters:

- Introduction: this chapter gives the background, problem statement, objectives, research questions, justification of the study and the organization of the study.
- Literature review: this part is all about what is known about HIV viral load suppression
- Methodology: will give details about how results were found.
- Results: this chapter concerns findings from data used for the study
- Discussions of the results: Compares the results of this study with other research done worldwide in the same context. It also presents limitations encountered
- Conclusion and recommendations: from findings of the study, recommendations are developed
- References

CHAPTER II. LITERATURE REVIEW

II.1. Definition of key terms

Human Immuno Deficiency Virus (HIV)

HIV (Humana Immuno Deficiency Virus) is a virus, which reproduces into the living cells. When entered in someone's body, attacks and decreases the capacity of immune system. For HIV infected person, the virus can be found in blood, liquid found in human sex, and some other body fluid (23–25).

Acquired Immuno Deficiency Syndrome (AIDS)

When HIV is introduced in someone's body, it slowly damages the capacity of the immune system in fighting against infectious microorganisms and the body start to be attacked by different pathogens both harmful and normal flora. As results, the infected person can start suffering from the different opportunistic diseases characterized by so many syndromes. At this stage, it is said that the HIV infected person is suffering from AIDS(23,25).

HIV Viral load

The HIV viral load is a total number of copies of HIV nucleic acid in body of someone living with HIV. It is measured as the number of copies of the virus in one milliliter of blood. This viral load measurement helps in monitoring the progress of HIV infection and the success of HIV treatment as well as the health status of people living with HIV(23,24).

Viral load suppression

The viral load suppression is used to say that someone under antiretroviral therapy, independently of any other criteria, have less than 200 copies of HIV nucleic acids per milliliter of blood at list after one year of well monitored treatment(19).

Unsuppressed HIV viral load

Unsuppressed viral load is a term used when someone is on antiretroviral therapy, independently of the age and still having more than 200 copies on HIV nucleic acid per milliliter of blood at least after one year of treatment(19).

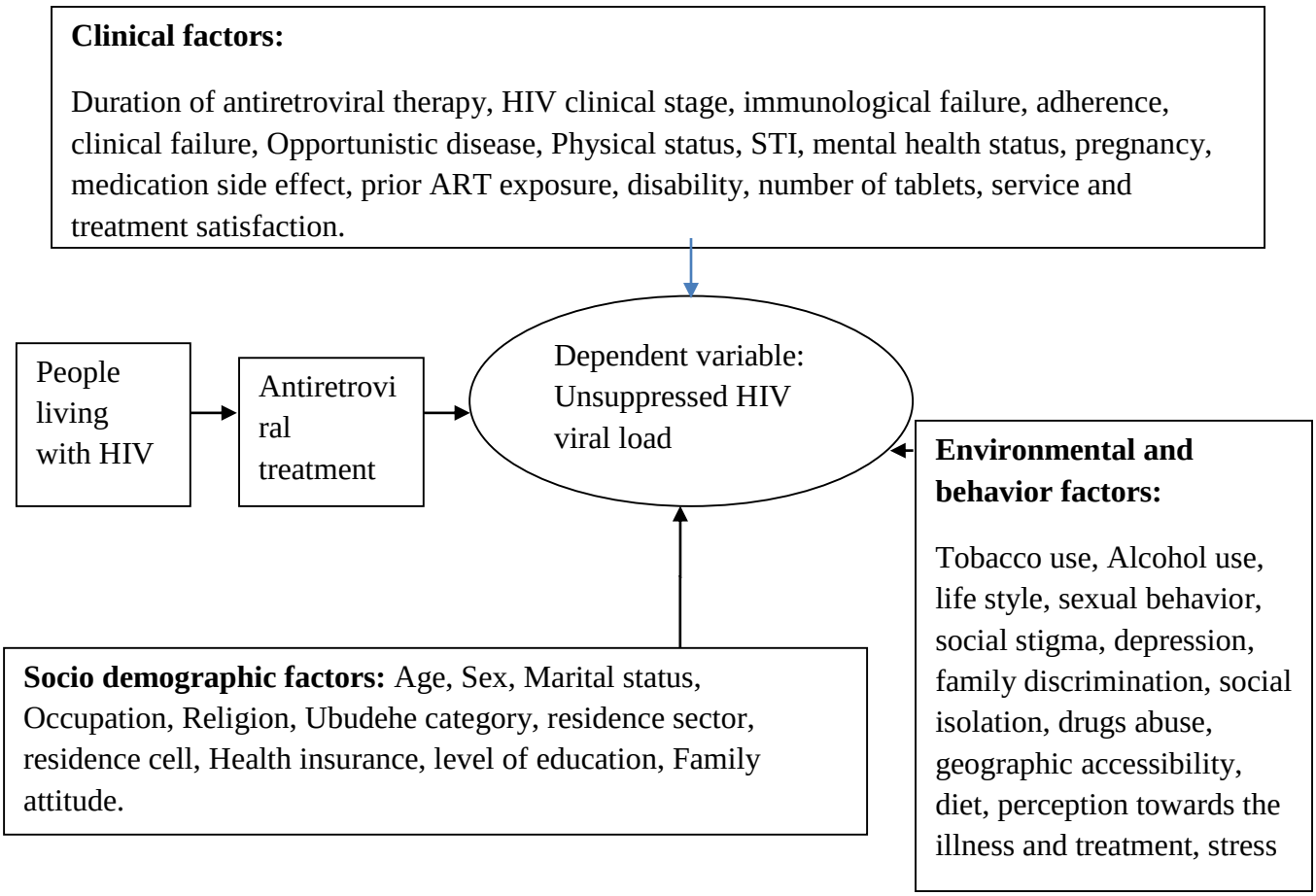
II.2. HIV patients satisfaction on service delivery

The quality of service is among elements that contribute to a good treatment adherence mainly for patients on long term treatment or whole life treatment. Among indicators of the quality of service include the confidentiality and short waiting time. It has been seen that the adherence to antiretroviral can depend on how a client is satisfied with the service delivery in relation to healthcare providers with professional guiding principles including keeping patient personal information confidential and a good treatment outcome. A study conducted in Vietnam showed that only 42.4% of patients on antiretroviral treatment were satisfied with the quality of service. In the same study, only few patients (18.8%) were satisfied with the treatment outcome(26). There is a study conducted in KwaZulu-Natal assessing the satisfaction of HIV and Tuberculosis patient on the service delivery where it has been seen that 95% of HIV patients were satisfied with healthcare services when attending the health facilities. But in some key aspect of services, this was slightly different; 16% of HIV patients reported to lack privacy when discussing with clinicians about their illness. As far as confidentiality is concerned, majority of patients (96%) reported to be comfortable with the mechanism involved in their information keeping in term of confidentiality and secret(27).

II.3. Factors associated with HIV unsuppressed viral load

The main target if initiating antiretroviral treatment is to improve someone's immune system and suppress HIV viral load. Some factors have been highlighted to negatively affect viral load suppression when someone is on antiretroviral treatment; these include the prolonged intake of alcohol in first month of treatment initiation, pregnancy, mental health disorders, substance abuse, weak social support, depression, medication side effects, prior ART exposure, stress, patients perception towards the illness and treatment, patient relationship with their clinicians, diet etc. As long as the adherence on antiretroviral is poor, the viral load will not be easily suppressed and this will affect the client well-being. As listed above, all of these factors associated with unsuppressed viral load can easily lead to poor adherence, thus, unsuppressed viral load(20,28–30).

II.4. Study conceptual framework



CHAPTER III. METHODOLOGY

III.1. Study Design

The study is a cross-sectional study. Data were collected using a developed questionnaire medical files review.

III.2. Research Setting

The study took place in Nyaruguru district. This district is one of 30 districts of Rwanda, located in the Southern province and counting 323,624 inhabitants. It is a district bordering Burundi. Further, Nyaruguru district is bordering Huye, Gisagara and Nyamagabe districts.

Nyaruguru is composed by 14 sectors where you find 16 health centers and 22 health posts. Nyaruguru district is irrigated by some of Rwanda main rivers such as Akanyaru and Mwogo. Four sectors of this district are bordering Nyungwe National Park. The whole zone of Nyaruguru district is served by Munini District Hospital that has 72 beds with full functional minimum district package. Antiretroviral therapy is provided in all Nyaruguru health facilities.

III.3. Study population

The study population was 2325 people living with HIV in Nyaruguru district, under antiretroviral therapy who were alive during our study period and who were willing to participate voluntarily in this study.

III.4. Study sample and sampling method

The prevalence of unsuppressed HIV viral load in Rwanda was 9% at the end of 2018. Based on this prevalence, the sample was calculated by using the formula below:

$\mathbf{N = Z^2_{(1-\alpha/2)} x P x (1-P)/D}$

D = 2.3%

$Z_{(1-\alpha/2)} = 1.96$

P = 0.09

Using the above prevalence, the computed minimum sample size was 579 participants to which 10% non-response or an expected missing data from medical records. Therefore, the total sample size was 637 participants. During the study period, Nyaruguru district was counting

2325 people living with HIV receiving ARV treatment for at least one year. This number was considered as study population from which the study sample was drawn. First, to know the total number of participants from each health facility to be included, the probability proportionate to size sampling technique was used as showed in the table 1:

Table 1: Sample calculation from each health facility

Health facility name	**Number of eligible people**	**Formula used to have sample**	**Number of participants**
Coko H C	54	637x54/2325	14
Cyahinda:	310	637x310/2325	83
Maraba:	43	637x43/2325	11
Nyantanga:	100	637x100/2325	23
Ngoma:	135	637x135/2325	35
Ngera:	104	637x104/2325	28
Kibeho:	204	637x204/2325	55
Kabilizi:	157	637x157/2325	43
Ruramba:	227	637x227/2325	61
Nyamyumba:	138	637x138/2325	37
Kivu:	77	637x77/2325	21
Muganza:	152	637x152/2325	41
Nyabimata:	121	637x121/2325	33
Ruheru:	97	637x97/2325	26
Runyombyi:	255	637x255/2325	68
Munini HC:	41	637X41/2325	11
Munini DH:	178	637X178/2325	47

This number of participants above included both suppressed and unsuppressed patients. The simple random sampling method was applied at each health facility to randomly get the total number of participants. At each health facility, all patient files were labeled with numeric numbers and by using excel, they was a random selection of the numbers. After the random selection of numbers, files with selected number were picked up to be reviewed for data

collection and patients to which files were selected, were interviewed to have additional information which cannot be found in the file. The confidence interval was 95% while the study power was 80% with the margin error of 5%.

III.5. Inclusion Criteria

To be included, patient could be at least 18 years old and able to respond. To be also included in the study, the patient was asked to have at least one viral load result in the period from July 2017 up to the period of the study as well as being on antiretroviral treatment in the period from July 2016 to June 2017.

III.6. Exclusion criteria

Were excluded from the study, participants who were not accepting to voluntary participation to the study as well as those who were absent at the time of data collection.

III.7. Data collection

There was a use of close-ended question by using a developed questionnaire. Missing data was collected from the patient medical files. In addition, participants were able to answer during the interview by the use of a guided administered questionnaire.

III.8. Data analysis

Data was analyzed using STATA software, 13.0 version. Univariate analysis was done to describe the socio-demographic characteristics of the participants, prevalence of the quality of adherence as well as clinical history then after, description of behavior and level of satisfaction. Bivariate analysis was done and variables with significant P values (P value less than or equal to 0.05) were put into a logistic regression model to identify the factors associated with unsuppressed HIV viral load among study participants. P values and odd ratio were used to identify significant variables and factors associated with unsuppressed HIV viral load. In social demographic characteristics analysis, age was put into different categories with 10 as interval between groups. For some variables, the number of participants was different from the whole study participants, the reason why such variables were marked with their exception participants (N)

III.9. Variables

Dependent variable:

Unsuppressed HIV viral load

Independent variables

Socio demographic variables

Age, Sex, Marital status, Occupation, Religion, Ubudehe category, Residence sector, Residence cell, Health insurance, Level of education and Family attitude.

Before carrying out the multivariate analysis, age was grouped into three groups to maximize the chance of having any significance between age groups.

Clinical variables

Duration of antiretroviral therapy, HIV clinical stage, Immunological failure, Adherence on treatment, Clinical failure, Opportunistic disease, Physical status, Sexual transmission infection, Mental health status, Pregnancy status, Medication side effect, Prior ART exposure and Disability

Environmental and behavior factors:

Tobacco use, Alcohol use, Life style, Sexual behavior, Social stigma, Depression, Family discrimination, Social isolation, Drugs abuse, Geographic accessibility and Diet.

III.10. Ethical consideration

This study was approved by the CMHS IRB. During this study, the confidentiality in relation to patient information, data management and storage was secured. We ensured the voluntary participation in the study, all study participants have signed the consent before being involved in the study and they were allowed to leave the study at any time they wanted to. During the whole process, data was kept in secured conditions and the study participant signed voluntary participation consent.

III. 12. Study limitation

This study was conducted in Nyaruguru district and therefore not generalizable to the whole country. Additionally, the direction of association cannot be précised since this study is a cross-sectional study.

CHAPTER VI. RESULTS

IV.1. Socio-demographic characteristics of the study participants

The table below includes the description of socio-demographic characteristics of the study population. Nearly two out of three study participants was female (57.77%). Further, the majority was between 38-47 years (36.26%), 71.59% were married, 55.57 were not educated), 93.72% were having health insurance) 44.43% were in ubudehe category 3(43.43%) and 90.43 of study participants were having family members who were aware of the serologic status.

Table 2: Description of socio-demographic characteristics

Variables	Frequency (N=637)	Percentage (%)
Age group		
18-27 years	60	9.42
28-37 years	94	14.76
38-47 years	231	36.26
48-57 years	186	29.20
58-67 years	66	10.36
Gender		
female	368	57.77
male	269	42.23
Marital status		
divorced	45	7.06
married	456	71.59
single	77	12.09
widower	59	9.26
Education level		
none	354	55.57
primary	253	39.72
secondary	30	4.71
Health insurance		
no	40	6.28
yes	597	93.72
Ubudehe category		
Category 1	116	18.21
Category 2	238	37.36
Category 3	283	44.43
Awareness of family member on the participant HIV status (n=606)		
Not aware	58	9.57
Aware	548	90.43

IV.2. Prevalence of unsuppressed VIH viral load and clinical history

Among our study participants, 8.95% were having unsuppressed HIV viral load while 91.05% were suppressing, 96.89% of participants were having the same HIV status with their sexual partner, 55.26of participants were having more than 10 years of treatment, 83.83% were having good adherence while 90.42% were not having interrupted their treatment, 94.03% were having no history of clinical failure,78.81% were receiving 1 tablet per day, 72.21%were having no history of having opportunistic diseases, 89.95% were not having sexual transmitted disease in their history, there was no history of mental disease for 95.92% of participants, 54.89% of female participants were not having pregnancy during the treatment period, 99.69% were not been exposed to antiretroviral before becoming HIV positive, 96.08% were not having any other chronic disease, 90.89% were having no depression symptom since they are HIV positive.

Table 3: Prevalence of unsuppressed VIH viral load and clinical history

Variables	Frequency	Percentage
Suppression		
No	57	8.95
Yes	580	91.05
HIV status of the participant sexual partner (n=482)		
HIV negative	15	3.11
HIV positive	467	96.89
ARV treatment duration for the participant		
1-5 years	162	25.43
5-10 years	123	19.31
>10 years	352	55.26
Quality of adherence		
Good	534	83.83
Fair	81	12.72
Poor	22	3.45
History of treatment interruption since ARV initiation		
No	576	90.42
yes	61	9.58
Number of tablet per day		
1 tablet	502	78.81
2 tablets	124	19.47
3 tablets	11	1.73
History of opportunistic disease since the HIV positivity		
No	460	72.21
yes	177	27.79
History of sexual transmitted disease since the HIV positivity		
No	573	89.95
yes	64	10.05
History of mental disease since the HIV positivity		
No	611	95.92
yes	26	4.08
History of pregnancy since ARV initiation (n=368)		
No	202	54.89
yes	166	45.11
History of ARV exposure before HIV positivity		
No	635	99.69

yes	2	0.31
Any other chronic disease		
No	612	96.08
yes	25	3.92
History of depression since HIV positivity		
No	579	90.89
yes	58	9.11

IV.3. Behavior and patients satisfaction

Among the study participant, 57.14% were consuming vegetables 1 to 3 days in a week while 62.64% of participants were drinking milk for 1 to 3 days in a week, 98.74% were having no physical disability, 57.46% were using 30 to 60 minutes to reach the health facility, 56.04% were alcohol consumers, 70.64% were having no history of having more than 1 sexual partner, 78.18% were having a good perception towards an incurable disease, 88.70% of participants were satisfied with the service delivery while 86.03 and 83.83% were satisfied with the clinician confidentiality and having a positive attitude toward a whole life treatment respectively.

Table 4: Behavior and patients satisfaction

Variables	Frequency	Percentage
Number of day for vegetables consummation per week		
1-3 days	364	57.14
4-7 days	151	23.70
every day	56	8.79
zero days	66	10.36
Number of day for milk drinking per week		
1-3 days	399	62.64
4-7 days	56	8.79
every day	7	1.10
zero days	175	27.47
Any physical disability		
No	629	98.74
yes	8	1.26
Time spent to reach health facility		
1-2 hours	171	26.84
30-60 minutes	366	57.46
<30 minutes	40	6.28
>2 hours	60	9.42
History of alcohol consummation		
No	280	43.96
yes	357	56.04
History of having more than one sexual partner		
No	450	70.64
yes	187	29.36
Clients perception toward the incurable disease		
bad	139	21.82
good	498	78.18
Clients perception toward the whole life treatment		
Bad	103	16.17
good	534	83.83
Level of satisfaction on service delivery		
Bad	72	11.30
Good	565	88.70
Level of satisfaction on the secret across the whole process of treatment		
Bad	88	13.81
good	549	86.03

IV.4. Bivariate analysis of socio-demographic, behavior and environment factors

At the end of the analysis of socio-demographic, behavior and environment factors, variables was seen to be probably associated with unsuppressed HIV viral load such as age (P = <0.001), gender (P = 0.013), level of study (P = <0.002),awareness of family member on the participant HIV status (P = 0.001), history of having more than one sexual partner (P = 0.029), client perception towards incurable illness (P = <0.001), client perception towards whole life treatment (P = <0.001), level of satisfaction on the service delivery (P = <0.005), level of satisfaction on confidentiality across the whole process of treatment (P = <0.016). The table below shows the findings after bivariate analysis of socio-demographic, behavior and environment factors.

Table 5: Bivariate analysis of socio-demographic, behavior and environment factors

	Unsuppressed HIV viral load					
Variables	No		yes			
Age group	**N**	**%**	**N**	**%**	**Odds ratio (C I at 95%)**	**P. Value**
31-67 years	39	7.04	515	92.96	1	
18-30 years	18	21.69	65	78.31	3.65 (1.97-6.76)	**<0.001**
Gender						**0.012**
Female	24	6.52	344	93.48	Reference	
Male	33	12.27	236	87.73	2.00 (1.15-3.41)	**0.013**
Education level						0.060
None	21	5.93	333	94.07	1	
Primary	34	13.44	219	86.56	2.46 (1.39-4.35)	**0.002**
secondary	2	6.67	28	93.33	1.13 (0.25-5.08	0.871
Health insurance						**0.416**
Yes	52	8.71	545	91.29	1	
No	5	12.50	35	87.50	1.49 (0.56-3.98)	0.419
Marital status						**<0.001**
Divorced	6	13.33	39	86.67	1	
Married	30	6.58	426	93.42	0.45 (0.17-1.16)	0.102
Single	17	22.08	60	77.92	1.84 (0.66-5.07)	0.238
Widower	4	6.78	55	93.22	0.47 (0.12-1.78)	0.270
Ubudehe category						
Category 1	11	9.48	105	90.52	1	
Category 2	18	7.56	220	92.44	0.78 (0.35-1.71)	0.537
Category 3	28	9.89	255	90.11	1.04 (0.50-2.18)	0.900
Awareness of family member on the participant HIV status (n=606)						
Aware	43	7.85	505	92.15	1	
Not aware	13	22.41	45	77.59	3.39 (1.69 - 6.77)	**0.001**
Number of day for vegetables consummation per week						
Every days	3	5.36	53	94.64	1	
4-7 days	8	4.03	143	95.97	0.98 (0.25-3.86)	0.987
1-3 day 3	45	1.88	319	88.12	2.49 (0.74-8.31)	0.137
zero day	1	1.52	65	98.48	0.27 (0.02-2.68)	0.265
Number of day for milk drinking per week						
Every days	0	0.00	7	100.00	1	
4-7 days	19	33.93	37	66.07	1	
1-3 days	27	6.77	372	93.23	0.38 (0.09-1.61)	0.191
zero day	11	6.29	164	93.71	0.23 (0.06-1.03)	0.053
Physical disability						
No	55	8.74	574	91.26	1	
yes	2	25.00	6	75.00	3.47 (0.68-17.64)	0.132
Time spent to reach health facility						
<30 minutes	6	15.00	34	85.00	1	
30-60 minutes	31	8.47	335	91.53	0.54 (0.19-1.50)	0.180
1-2 hours	15	8.77	156	91.23	0.52 (0.20-1.34)	0.242

>2 hours	5	8.33	55	91.67	0.51 (0.14-1.81)	0.303
History of alcohol consummation						
No	24	8.57	256	91.43	1	
Yes	33	8.95	324	90.76	1.08 (0.62-1.88)	0.768
History of having more than one sexual partner						
No	33	7.33	417	92.67	1	
Yes	24	12.83	163	87.17	1.86 (1.06-3.24)	**0.029**
Client perception towards incurable illness						
Good	25	5.02	473	94.98	1	
Bad	32	23.02	107	76.98	5.65 (3.22-9.94)	**<0.001**
Client perception towards whole life treatment						
Good	29	5.43	505	94.57	1	
Bad	28	27.18	75	72.82	6.50 (3.66-11.53)	**<0.001**
Level of satisfaction on the service delivery						
Good	44	7.79	521	92.21	1	
Bad	13	18.06	59	81.94	2.60 (1.32-5.12)	**0.005**
Level of satisfaction on the secret across the whole process of treatment						
Good	43	7.84	506	92.16	1	
Bad	14	15.91	74	84.09	2.22 (1.16-4.26)	**0.016**

IV.5. Bivariate analysis of clinical characteristics

The analysis of clinical characteristics has shown some variables significantly associated with unsuppressed HIV viral load such as: HIV status of the participant sexual partner (P = 0.007), ARV treatment duration of 1 to 5 years (P = 0.047), history of clinical failure (P = <0.001), history of treatment interruption since ARV initiation (P = <0.001), fair quality of adherence (P= <0.001), poor quality of adherence (P=<0.001), taking 2 or 3 ARV tablets per days (P = <0.001), history of opportunistic disease since the HIV positivity (P = <0.001) and history of depression since HIV positivity (P = <0.001).

Table 6: Bivariate analysis of clinical characteristics of the study participants

	Unsuppressed HIV viral load					
Variable	**No**		**Yes**			
	N	**%**	**N**	**%**		
HIV status of the participant sexual partner (n=482) 0.003						
HIV Positive	30	6.42	437	93.58	1	
HIV negative	11	73.33	4	26.67	5.29 (1.59-17.63)	**<0.007**
ARV treatment duration						
>10 years	18	5.11	334	94.89	1	
5-10 years	23	18.70	100	81.30	0.84 (0.91-2.21)	0.667
1-5 years	16	9.88	146	90.12	2.03 (2.21-8.22)	**0.047**
Quality of adherence						
Good	18	3.37	516	96.63	1	
Fair	25	30.86	56	69.14	12.79 (6.57-24.90)	**<0.001**
Poor	14	63.64	8	36.36	50.16 (18.68-134.69)	**<0.001**
Treatment interruption						
No	21	3.65	555	96.35	1	
yes	36	59.02	25	40.98	38.05(19.45-74.44)	**<0.001**
Number of ARV tablet per gay						
1 tablet	11	2.19	491	97.81	1	
2 tablets	43	34.68	81	65.32	23.69 (11.73-47.84)	**<0.001**
3 tablets	3	27.27	8	72.73	16.73 (3.90-71.73)	**<0.001**
History of opportunistic disease since the HIV positivity						
No	19	4.13	441	95.87	1	
yes	38	21.47	139	78.53	6.34 (3.54-11.36)	**<0.001**
History of sexual transmitted disease since the HIV positivity						
No	47	8.20	526	91.80	1	
yes	10	15.63	54	84.38	2.07 (0.99-4.33)	0.053
History of mental disease since the HIV positivity						
No	55	9.00	556	91.00	1	
yes	2	7.69	24	92.31	0.84 (0.19-3.65)	0.819
History of pregnancy since ARV initiation (n=368)						
No	18	0.97	184	96.03	1	
yes	15	9.04	151	90.96	0.95 (0.54-1.75)	0.878
Any exposure to ARV						

No	57	8.98	578	91.02	1	
Yes	0	0.00	2	100.00	1	
Any other chronic disease						
No	52	8.50	560	91.50	1	
Yes	5	20.00	20	80.00	2.69 (0.97-7.46)	0.057
History of depression since HIV positivity						
No	40	6.91	539	93.09	1	
Yes	17	29.31	41	70.69	5.58 (2.91-10.70)	**<0.001**

IV.5. Multivariable analysis

After the analysis, the following factors were significantly associated with the unsuppressed HIV viral load: gender [Adjusted Odds Ratio (aOR) = 3.02, confidence interval (CI) = 1.19 – 7.64; P value (P) = 0.020]; client perception toward the whole life treatment [aOR = 4.32, CI = 1.98 – 18.99; P = 0.049];history of treatment interruption [aOR= 8.29, CI = 2.60 – 26.42; P = 0.002]; history of clinical failure [aOR = 3.14, CI = 1.70- 14.03; P = 0.034]; Perception toward the secret across the treatment process [aOR = 1.11, CI = 0.02- 0.53; P =0.006]. The table below shows all variables analyzed in multivariate analysis.

Table 7:Multivariate analysis of significant variables

Risk Factor	Adjusted Odds Ratio (aOR) 95% confidence interval (CI)	P values
Gender		
Female	1	**0.020**
Male	3.02 (1.19- 7.64)	
Age group		
31-67years	1	
18-30 years	0.99(0.30 - 3.25)	0.994
HIV status of the sexual partner		
Positive	1	
Negative	0.29 (0.29 – 2.99)	0.303
Family member awareness on participant HIV status	1	
Yes	0.50 (0 .21 – 1.14)	0.102
No		
Education level		
None	1	
Primary	1.97 (0.87-4.02) 0.061	
Secondary	3.02 (0.17- 67.65)	0.058
Treatment duration		
>10 years	1	
5-10 years	0.72 (0.20- 2.52)	0.482
1-5 years	1.19 (0.69 - 5.42)	0.209
Adherence quality		
Good	1	
Fair	1.34 (0.37 - 4.79)	0.651
Poor	3.23(0.55 – 19.03)	0.194
History of treatment interruption		
No	1	
Yes	8.29 (2.60 – 26.42)	**0.002**
History of having opportunistic infection	1	
No	0.95(0.77 - 6.14)	0.139
Yes		
History of having depression		
No	1	
Yes	2.21 (0.73 – 13.60)	0.061
Perception toward incurable diseases		

No	1	
Yes	0.35 (0.10 – 1.20)	0.098
Having more than one sexual partner		
No	1	
Yes	2.33 (0.90-6.01)	0.052
Number of ARV tablet per day		
1 tablet	1	
2 tablets	12.63 (0.93-51.87)	0.061
3 tablets	5.71 (0.52-62.38)	0.153
Good perception toward the whole life treatment	1	
Yes	4.32 (1.98 – 18.99)	0.049
No		
Good perception toward the quality of the service	1	
Yes	3.14 (0.85 – 11.62)	0.080
No		
Good perception toward the secret across the treatment process		
Yes	1	
No	1.11 (0.02- 0.53)	**0.006**
Good perception towards incurable disease	1	
Yes	4.02 (1.00-16.19)	0.051
No		

CHAPTER V. DISCUSSION

The current study has assessed factors associated with unsuppressed HIV viral load among people living with HIV in Nyaruguru district. Nearly two out of three study participantswas females (57.77%) while males were 42.23%. This increased number of female is justified by the prevalence of HIV in Rwanda where HIV is more prevalent in females than in male. According to this, it is expected to have so many females living with HIV than males among HIV infected people on follow up in any health facility(31). This is comparable to the findings of Lemma Negesa et al in the study entitled "Adherence to Antiretroviral Therapy and Factors affecting among People Living with HIV/AIDS and Taking Antiretroviral Therapy, Dire Dawa Town, Eastern Ethiopia, 2017". This Ethiopian study highlighted that 39.8% were males while and 60.2% were females(32). Even if many studies have found females to be greater than males including our study as said above, Basavaprabhu Achappa et al found 69% of males and 31% of females in the study entitled "Adherence to Antiretroviral Therapy among people living with HIV, 2016(29)".

In this study, the prevalence of unsuppressed HIV viral load among our participants was 8.95%. This is comparable to the findings of Suresh Rangarajan*et al* in their study entitled "Factors associated with HIV viral load suppression on antiretroviral therapy in Vietnam" where 7% were not suppressing (20). But our finding slightly different from the findings of Yuriko Limmade*et al* in their research entitled "HIV treatment outcomes following antiretroviral therapy initiation and monitoring: A workplace program in Papua, Indonesia, 2019". They found that up to 20% were not suppressing(21). This good suppression prevalence is due to many efforts of the Rwandan Ministry of Health and Rwanda Biomedical Center in following up closely people living with HIV and by implementing the principle of 'test and treat' where people are tested and put on ARVs directly after being identified HIV positive(31).

We measured the patient satisfaction toward the service delivery, where we found that 88.7% were positively satisfied on the quality of the service. The satisfaction rate is good due to daily sensitization on good service delivery which is included in all level of public and private sectors to meet the customer's need.

Male gender was associated to the unsuppressed HIV viral load [aOR= 4.61, CI = 1.66 - 12.78; P = 0.003] where males were almost five times more likely to have unsuppressed HIV viral load

compared to females. This finding corroborate with the finding of D Joseph Davey *et al* in their study entitled "Factors associated with recent unsuppressed viral load in HIV-1-infected. patients in care on first-line antiretroviral therapy in South Africa, 2018" where they found that male gender was associated with unsuppressed HIV viral load [aOR= 1.29, CI = 1.25–1.35; P = 0.001](33). This also has been found the study of Titou Hicham*et al* entitled "Risk Factors Associated with Unsuppressed Viral Load in HIV-1 Infected Patients at the First Antiretroviral Therapy in Morocco, 2019" where they found that male gender was significantly associated with unsuppressed HIV viral load (P = 0.01)(34). Due to their life style, such as alcohol consumption, sexually active, movement into or outside the country for economic issues, low level of using health services, etc, male are more likely to interrupt the treatment and final have poor adherence which can led them to have unsuppressed HIV viral load if compared to females.

ARV interruption was found to predict unsuppressed HIV viral load [aOR= 7.80, CI = 1.96 - 30.95; P = 0.003], the patients interrupting treatment were almost eight times more likely to have unsuppressed IHV viral load compared to those who are having all prescribed doses without interruption. The finding from our study was similar to the finding of Peter Cherutich*et al* in the study entitled "Detectable HIV Viral Load in Kenya: Data from a Population-Based Survey, 2016", they found that [aOR = 2.6, CI = 1.0–7.1; P = 0049], from this study, clients interrupting treatment were almost three times more likely to have unsuppressed HIV viral load compared to those who take all prescribed doses(35).

Reference to the good attitude toward the whole life treatment, the bad perception to the whole life treatment was significantly associated with unsuppressed HIV viral load [aOR = 0.25, CI = 0.07 - 0.89; P = 0.034]. This finding was fitting with the finding of KolabChhim*et al* in the study entitled "Factors associated with viral non-suppression among adolescents living with HIV in Cambodia: a cross-sectional study, 2018" as they found that the bad perception toward the whole life treatment was significantly associated with unsuppressed HVI viral load in adolescents [aOR = 0.40, CI = 0.21–0.75; P = 0.005]. As other drugs, ARV has their shelf life in someone's body. Any drug interruption will decrease the synergic capacity of ARV then the virus can perform its metabolism so that new viruses are produced. When there is treatment interruption, there is more chance of inhibiting virus metabolism then increasing suppression rate.

In our study, we found that the poor quality of service such as the confidentiality was significantly associated with unsuppressed HIV viral load, [aOR = 1.11, CI= 0.02- 0.53; P =0.006]. Patients having the bad perception toward the secret keeping, were more likely to have unsuppressed HIV viral load compared to those with a good perception toward the illness secret keeping. When the patient does not believe in clinician in term of secret keeping and confidentiality, the adherence becomes poor and the motivation of attending the health facility in not good and all of these can even lead to periodic treatment interruption. This finding corroborate with the finding of Kolab Chhim*et al* in the study entitled "Factors associated with viral non-suppression among adolescents living with HIV in Cambodia: a cross-sectional study, 2018". They found that confidentiality and disease secret is key in quality of service, so, lack of confidentiality was associated with unsuppressed HIV viral load [aOR = 2.95, CI = 1.56 – 5.99; P =0.001](30). In case of poor quality of service mainly when confidentiality is not respected, some patients will have poor adherence characterized by irregular ARV intake and as said above, this can lead to poor treatment outcome.

CHAPTER VI. CONCLUSION AND RECOMMENDATION

VI.1. Conclusion

Females were 57.77% while males were 42.23% more prevalent than males. The viral load suppression was found to be 8.95% among the study population while the satisfaction on the quality of the service was 88.7%. Given factors identified as being associated with unsuppressed HIV viral load such as Male gender, treatment interruption, whole life treatment, confidentiality in health care provider and clinical failure, improving adherence and quality of service will help in having suppressed viral load, patients continuous education is needed to sensitize on adherence so that, they will be alow level of drugs interruption which was highlighted as measure cause of unsuppressed viral load. Psychological support is also needed to be involved in patient follow up given that lack of confidentiality and negative perception toward the whole life treatment were found to be associated with unsuppressed viral load.

VI.2. Recommendation

After this study and according to the findings, some recommendations were highlighted as follow:

- ✓ The Ministry of Health through the Rwanda Biomedical Center should reinforce the regular monitoring of peripheral health facilities and try to do the regular analysis of data from those health facilities to early track some factors associated with unsuppressed HIV viral load such as irregular adherence, treatment failure, etc.
- ✓ The District Hospital supervision and HIV mentor team should early intervene at all level of the catchment area in case of irregular adherence and treatment interruption as well as any other suspected factor
- ✓ Health care providers should increase their capacity in term of secret management and good service delivery
- ✓ Information, Education and Communication (IEC) from all health care providers to people living with HIV, should insist on how to live with incurable disease and whole life treatment.

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Appendix 1: Informed consent document (English version)

Information sheet

I am called François HAKIZAYEZU; I am a student in Masters Program, Field epidemiology and Laboratory Training Program at the University of Rwanda and I am carrying out a study entitled: "**Assessment of factors associated with unsuppressed HIV viral load among people living with HIV in Nyaruguru district, Rwanda, since July 2016 to June 2017".**

There is no direct benefit from this study, but its findings will help in improving VIH management in this area in term of HIV viral load testing and results availing in timely manner so that, the follow up of people living with HIV will improve mainly when there is a need of switching on the second – line treatment regime.

The information will be gathered from the participants after filling the questionnaire. The information will include socio demographical, clinical data, environment and behavior data all related to HIV treatment regarding HIV.

In fact, the participation in this study is voluntary, mean that you are free to withdraw from the study at any time without any penalty and you are free from refusing starting with us. The information you will give through this study, will not affect you in the usual life because no participant name will be used and the whole given information will be treated confidentially. For any queries or questions, contact me through the University of Rwanda, College of Medicine and Health sciences the Chairperson of the CMHS IRB (0788 490 522) and of the Deputy Chairperson (0783 340 040), contact the supervisors of this research on 0788412644/0788454613 or use my cell phone 0788681637.

Will you please sign to your willingness to participate?

Participant's Statement:

The study described above has been explained to me for my full understanding and I voluntarily give consent to participate in this study.

Participant ……Date……

Investigator's Signature……Date…….

Appendix 4: Informed consent documents (Kinyarwanda version)

AmazinayanjyenitwaFfrançois HAKIZAYEZU; umunyeshuri muri Kaminuza y'Urwanda, agashami ko kurwanyaindwaraz'ibyorezo no gukurikirana imikorere yaza Loboratwari nkaba ndigukora ubushakashatsi kuivurwa ry'ababana n'ubwandu bw'agakoko gatera SIDA n'impamvuzatumaurikuvurwaushoboragugumanaudukokotwinshi mu marasoye.

Ntagihembo cy'akokanya kiri muri ubu bushakashatsi, ahubwo buzafasha mukongera serivisi nziza mu bijyanye no gukurikirana ababana n'ubwandu bw'agakoko gatera SIDA no kurushaho kubafasha udukoko dutera SIDA tukagabanuka mu maraso yabo.

Gufatanya mu bushakashatsi ni ubushake kandi ufite uburenganzira bwoguhagarika ububushakashatsi igihe cyose ushatse ntazindi nkurikizi zibayeho. Ibisubizo muduha muri ubu bushakashatsi ntangaruka bigira k'ubuzima bwanyu bwa burimunsi cyangwa kumibanire yanyu n'ubuyobozi bw'ikigo nderabuzima cyane ko ntamazina yanyu azakoreshwa kandi ibyomuzasubiza bikazagirirwa ibanga rihagije. Uramutse ugize ikibazo kubijyanye n'ubu bushakashatsi wahamagara nomero zikurikira: Uhagarariye ubushakashatsi muri Kaminuza y'Urwanda (0788 490 522) umwungirije (0783 340 040), abakurikirana ubu bushakashatsi (0788412644/0788454613) cyangwa urigukora ubu shakashatsi (0788681637).

Nimwemera ko dufatanya muri ubu bushakashatsi, murasinya ku rupapuro ahabugenewe.

Kwemera gufatanya mu bushakashatsi

Numvise neza igikorwa cy'ubushakashatsi nasobanuriwe, nka ba nemeye kubushake gufatanya muri ubu bushakashatsi

Umukono w'uwiyemeje gufatanya mu bushakashatsi…….....itariki……

Umukono w'uri gukora ubushakashatsi…….....itariki……

Appendix 3. Questionnaire

I am called François HAKIZAYEZU; I am a student in Masters Program, Field epidemiology and Laboratory Training Program at the University of Rwanda and I am carrying out a study entitled: "**Assessment of factors associated with unsuppressed HIV viral load among people living with HIV in Nyaruguru district, Rwanda, since July 2016 to June 2017".**I would you to help me in having information on this study by answering the below question and this will be anonymously treated with a high level of secret and confidentiality.

Questionnaire number------- ----------

Name of health facility----------

Participant number identification number……..

Part1:IDENTIFICATION

1. District of residence: ……
2. Sector:……
3. Cellule:……..
4. Health facility of follow-up……..

Part2: SOCIO-ECONOMIC FACTORS

Gender

1.Male

2.Female

Age:……

What is your level of study?

1. Non educated

2. Primary

3. Secondary

4. University

Have you any health insurance?

1. Yes
2. No

What is your occupation?

1. Unemployed
2. Employed
3. Private worker

What is your marital status?

1. Single
2. Married
3. Separated
4. Divorced
5. Widower

If married, have you the same HIV status with your partner?

1. Yes
2. No

If no for the question above, is your partner aware of your status?

1. Yes
2. No

If yes for the question above, is your partner have the positive attitude towards your status

1. Yes
2. No

What is your religion?……

Which is your Ubudehe category?

1. Category 1
2. Category 2
3. Category 3
4. Category 4

Do you live with other family member?

1. Yes
2. No

Have your family members a good attitude toward your serologic status?

1. Yes
2. No

Do your family members support you in your usual life related to HIV status?

1. Yes
2. No
3. Don’t know

In a typical week, how many days do you eat fruits

1. Daily
2. 1-3 days
3. 4-7 days
4. Zero days

In a typical week, how many days do you eat vegetables?

1. Daily
2. 1-3 days
3. 4-7 days
4. Zero days

In a typical week, how frequently do you eat meat?

1. Daily
2. 1-3 days
3. 4-7 days

4. Zero days

5. In a typical week, how frequently do you drink milk?

1. Daily
2. 1-3 days
3. 4-7 days
4. Zero days

Part 3: Clinical information

How long time are you on antiretroviral therapy:

1. 1 year
2. 1-5 year
3. 5-10 year
4. Above 10 years

Which is yourHIV clinical stage?

1. Stage 1
2. Stage 2
3. Stage 3
4. Stage 4

Which are recent viral load results?

1. Viral lord suppressed (below200 copies)
2. Viral lord unsuppressed (above 200 copies)

Have you had an immunological failure since you started treatment up to 2017?

1. Yes
2. No

Have you anytime topped treatment since you started treatment up to 2017?

1. Yes
2. No

If yes, how much time?

1. 1-10 days
2. 10-30 days
3. 1-3 months
4. 3-5 months
5. More than 5 months

If any days spent without taking drugs, which were the reasons behind

1. Severe illness
2. Medical reason
3. Drugs stock out
4. Drugs effect
5. Unknown reason
6. Believe to be cured
7. Undocumented patients transfer

Which adherence status for the clients?

1. **Poor** (Less than 85%)
2. **Good** (85% to 94%)
3. **Very good** (Above 95%)

How many number of tablet of antiretroviral to you take per day?

1. One
2. Two
3. Three
4. Four
5. More than four

Have you ever had a clinical failure?

1. Yes

2. No

Have you any physical disability avoiding you to regularly consult the health facility?

1. Yes
2. No

Have you ever had an opportunistic disease since you have been HIV positive?

1. Yes
2. No

Have you ever had a sexual transmission infection since you have been HIV positive?

1. Yes
2. No

Have you had any mental diseasesince you have been HIV positive?

1. Yes
2. No

Have you been pregnant since you started ARV until 2017?

1. Yes
2. No

Have you had any Prior ART exposure in your life before being HIV positive?

1. Yes
2. No

Have you any other chronic disease?

1. Yes
2. No

If yes to the question, which one?

1. Diabetes
2. Cancer
3. Hypertension
4. Renal failure
5. Heart failure
6. Liver failure
7. Other, specify…….

Have you ever had any depression symptom since you have been HIV positive?

1. Yes
2. No

Which among these symptoms have you had?

1. Fatigue
2. Impaired concentration
3. Insomnia
4. Hypersomnia
5. Recurring thoughts of death or suicide
6. Social isolation

Part 4:Environmental and behavior factors:

How much time do you spent to go at the health facility?

1. <30 minutes
2. 30 – 60 minutes
3. 1 – 2 hours
4. Above 2 hours

Have you ever smoked in your life?

1. Yes
2. No

If yes for the question above, for how long time?

1. Less than 5 months

2. 5-12 months
3. 1-5 years
4. 5-10 years
5. More than 10 years

Have you ever drunken alcohol in your life?

1. Yes
2. No

If yes for the above question, for how long time?

1. Less than 5 months
2. 5-12 months
3. 1-5 years
4. 5-10 years
5. More than 10 years

Have you ever hadmore than one sexual partner?

1. Yes
2. No

Have you ever had any Drugs abuse in your life?

1. Yes
2. No

If yes to the question above, for how long time?

1. Less than 5 months
2. 5-12 months
3. 1-5 years
4. 5-10 years
5. More than 10 years

What is your perception towards your illness?

1. Good
2. Bad
3. Don’t know
4. Not responding

How are you satisfied with antiretroviral therapy for your whole life?

1. Good
2. Bad
3. Don’t know
4. Not responding

How are you satisfied withthe quality of service delivery?

1. Good
2. Bad
3. Don’t know
4. Not responding

How are you satisfied with waiting time when visiting the health facility?

1. Good
2. Bad
3. Don’t know
4. Not responding

How are you satisfied with the healthcare provider secret across the whole process at thehealth facility?

1. Good
2. Bad
3. Don’t know
4. Not responding

How do you appreciate the seriousness of your clinician in term of secret?

1. Good
2. Bad
3. Don’t know
4. Not responding

Thank you for your participation!!!!!!!!!

Apendix 4. Ibibazo birebana n`ubushakashatsi mu gushaka amakuru

Nitwa François HAKIZAYEZU; ndiUmunyeshurimuriKaminuzay'u Rwanda mu shamirya "Field epidemiology and Laboratory Training Program"nkabandigukoraubushakashatsibwitwa "Assessment of factors associated with unsuppressed HIV viral load among people living with HIV in Nyaruguru district, Rwanda, since July 2016 to June 2017".Tugenekereje mu Kinyarwanda "Gushakaimpamvuzitumaagakokogatera SIDA katagabanuka mu mubirikubabanan'ubwandubw'agakokogatera SIDA mu karere ka, kuvamuriNyakanga 2016 kugezaKamena 2017". Nkabanabasabagakunfashaamakuruajyanyen'ububushakashatsimusubizaibibazobikurikirakandia makurun'ibangaanabikwabyujujeumutekanontazinary'uwayatanzeririho.

Izinary'ivuriro----------

Nomeroirangausubiza …….

UMWIRONDORO

Akarere atuyemo: ……
Umurenge:……
Akagali:……..
Ivurirorimukurikirana……..

Amakuruy'irangamimereren'ubukungu

Igitsina

1. Gabo
2. Gore

Imyaka: ……

Wizeayahemashuri?

1.ntiyize

2. yizeabanza

3. yizeayisumbuye

4. Yizekaminuza

Mufiteubwishingizibwokwivuza?

1. yego
2. oya

Acyoakora?

1. Ntakaziafite

2. Afiteakazikamuhemba

Arikorera

Mufiteiyiherangamimerere?

1. Ingaragu
2. yarashyingiwe
3. yatandukanyenuwobashakanyebitemewen'amategeko
4. Yatandukanyenuwobashakanyebyemewen'amategeko
5. yarapfakaye

Nibawarashatse, uwomubananaweafiteubwandu?

1. yego
2. oya

Nibaarioyakukibazocyoharuguru, uwomwashakanyeazikouwobabana yanduye?

1. yego
2. oya

Nibaariyegokukibazocyoharuguru, uwomwashakanyeyakiriyenezaubwandu bwawe?

1. yego
2. oya

Usengeramurihedini?……

Uba mu kihe**cyicirocy'ubudehe?**

1. Icyicirocya
2. Icyicirocya
3.Icyicirocya
4.Icyicirocya

Hariabandibavandimwemubana?

1. yego
2. oya

Abavandimwemubanabakiriyenezakubaufiteubwandu?

1. yego
2. oya

Abavandimwemubanabakubahafi mu kubaubanan'ubwandu?

1. yego
2. oya
3. Ntabwombizi

Muryaimbutoinshurozingahe mu cyumweru?

1. Burimunsi

2. Imnsi 1-3

3 . Iminsi 4-7

4. Ntazoarya

Munryaimbogakangahe mu cyumweru?

1. Burimunsi
2. Imnsi 1-3
3. Iminsi 4-7
4. Ntazoarya

Muryainyamakangahe mu cyumweru?

1. Burimunsi
2. Imnsi 1-3
3. Iminsi 4-7
4. Ntazoarya

6. Mu cyumwerucyoseunywaamatakangahe?

1. Burimunsi
2. Imnsi 1-3
3. Iminsi 4-7
4. Ntazoarya

Amakuruajyanyen'ubuzima

Umazeigihekinganaikiurikumitiigananyaubukanabw'agakokogatera SIDA**?**

1. Umwaka 1
2. Imyaka 1-5

3. Imyaka 5-10
4. Hejuruy'imyakaicumi

Ni iyihe stade ckiniqueariho?

1. Stade 1
2. Stade 2
3. Stade 3
4. Stade 4

Ibisubizobya charge viral aherukabyagaragajeiki?

1. Viral lord suppression (charge viral irimunsiya 200)
2. Viral lord unsuppression (Charge viral irihejuruya 200)

Yigeze agira echeque immunologique kuvaahoyatangiriyeimitikugeza 2017?

1. yego
2. oya

Wabawarigezeuhagarikaimitikuvakuvaahoyatangiriyeimitikugeza 2017?

1. yego
2. oya

Nibaariyegokukibazocyoharuguru, yamazeigihekinganaikiadafataimiti?

1. Iminsi 1-10
2. Iminsi 10-30
3. Amezi 1-3
4. Amezi 3-5
5. Hejuruy'amezi 5

Ni izihempamvuzaguteyeguhagarikaimitiicyogihe?

1. Kuberaubundiburwayi
2. Abisabwenamuganga
3. Imitiyabuze
4. Kuberaimitiyamuguyenabi
5. Yanzekuyifatantampamvu
6. Kuberakujyakurey'ahoakurikiranirwantibikurikiranwe
7. Kuberakwibwirakoyakize

Umurwayiyubahirizagahundayogufataimitikukihegipimo?

1. Nabi (munsiya 85%)
2. Neza (85% - 94%)
3. Nezacyane (hejuruya 95%)

Ufataibininibingahekumunsi?

1. kimwe
2. bibiri
3. bitatu
4. bine
5. hejuruya bine

Yigezeagira "echeque Clinique"?

1. yego
2. oya

Haba hariubumugaufitebukubangamira mu kugerakuvuriro?

1. yego
2. oya

Wabawarigezekugiraicyuririzikuvawakwandura?

1. yego
2. oya

Wabawarigezekurwara IST kuvawakwandura?

1. yego
2. oya

Wabawarigezeugirawburwayibwo mu mutwekuvayakwanduraagakokogatera SIDA?

1. yego
2. oya

Wigezeutwitakuvaahowatangiriyeimitikugeza 2017?

1. yego
2. oya

Wabawarigezeufata ARV kumpamvuiyariyoyosembereyokwanduraagakokogatera DISA?

1. yego
2. oya

Wabaharindindwaraidakiraufite?

1. yego
2. oya

Nibaaribyo, niyihemuriizi?

1. Diabetes

2. Cancer
3. Hypertension
4. Renal failure
5. Heart failure
6. Liver failure
7. Other, specify…….

Wabawarigezekugiraikimenyetsocyokwiheba (depression) kuvawakwandura?

1. yego
2. oya

Nibaariyego, niikihewagizemuriibibikurikira?

1. Fatigue
2. Impaired concentration
3. Insomnia
4. Hypersomnia
5. Recurring thoughts of death or suicide
6. Social isolation

Environmental and behavior factors:

Bigutwaraigihekinganaikikugerakwivuriro?

1. Munsiy'iminota 30
2. Iminota 30 – 60
3. Amasaha 1 – 2
4. Hejuruy'amasaha 2

Wigezeunywaitabi mu buzimabwawe?

1. yego
2. oya

Nibaariyego, warinyweyeigihekinganaiki?

1. Munsiy'amezi 5
2. Amezi 5-12
3. Imyaka 1-5
4. Imyaka 5-10
5. Hejuruy'imyaka 10

Wigezeunywayinzoga mu buzimabwe?

1. yego
2. oya

Nibaariyego, wazinyweyeigihekinganaiki?

1. Munsiy'amezi 5
2. Amezi 5-12
3. Imyaka 1-5
4. Imyaka 5-10
5. Hejuruy'imyaka 10

Wigezeugira abo mukoranaimibonanompuzabitsinabarenzeumwe?

1. yego
2. oya

Wigezeufatakubiyibyabwenge mu buzimabwawe?

1. yego
2. oya

Nibaariyego, wabifasheigihekinganaiki?

1. Munsiy'amezi 5
2. Amezi 5-12
3. Imyaka 1-5
4. Imyaka 5-10
5. Hejuruy'imyaka 10

Murirusangewakiriyeutekubanan'ubwandu?

1. neza
2. nabi
3. ntabyoazi
4. Yifashe

Wumvaunyuzwegute no gufataimitiubuzimabwebwose ?

1. neza
2. nabi
3. ntabyoazi
4. Yifashe

Wishimiragute service uhabwakwamuganga ?

1. neza
2. nabi
3. ntabyoazi
4. Yifashe

Wishimiraguteigiheumaraurindiriyemuganga?

1. neza

2. nabi
3. ntabyoazi
4. Yifashe

Wishimiraguteibangaugirirwaigihecyoseguheraugezekwamugangakugeza utashye?

1. neza
2. nabi
3. ntabyoazi
4. Yifashe

Ubonauteubunyangamugayobw'umwakirakwamugangakubijyanye no kukubikira ibanga?

1. neza
2. nabi
3. ntabyoazi
4. Yifashe

Urakozecyanekudufashauduhaayamakuru !!!!!!!!!