CORRELATES OF HIV VIRAL LOAD SUPPRESSION AMONG HIV POSITIVE ADULTS ON CARE IN NAKURU COUNTY, KENYA

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DECLARATION

The Research Project is my original work and has not been presented for degree in any other University

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This Research Project has been submitted for examination with my approval as the University supervisor.

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DEDICATIONS

To my parents, Seif Bendera Rocky and Khadija. My family, Wife, Fatuma Suleiman and Children, Khadija, Khashi, Seif and Sophia and my friends, Bongo, John Njuguna and Solomon for always encouraging me to achieve the highest degree of excellence.

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ABBREVIATIONS

ART	:	Antiretroviral therapy
CD4	:	Cluster of differentiation
EID	:	Early Infant Diagnosis
EQHIV	:	Evaluation of Quality Improvement for HIV Care
HIV/AIDS	:	Human Immune Virus/ Acquired Immune Deficiency Syndrome
HIV/RNA	:	HIV is composed of ribonucleic acid (RNA).
HIV-QERI	:	HIV Quality Enhancement Research Initiative
HIVQUAL	:	HIV Quality of Care
IHIC	:	Institute for Healthcare improvement Collaborative
IOM	:	Institute of Medicine
KASF	:	Kenya Strategic Framework
NASCOP	:	National AIDS & STI Programme
NHSSIP	:	Nakuru Health Sector Strategic and Investment Plan
OI	:	Opportunistic Infection
UNAIDS	:	United Nations Programme on HIV/AIDS

DEFINITION OF TERMS

Health Care Quality : This is mark of health care services that can be given to individuals or populations which increases chances of desired health results(National Institute for Health and Care Excellence, 2016).

Quality Measurements: Boundaries that focus on structures or processes of health care that are lined with relationships on health outcomes(National Institute for Health and Care Excellence, 2016).

Viral Suppression : When antiretroviral therapy (ART) decreases a person's viral load (HIV RNA) to an unnoticeable level(Joint United Nations Programme on HIV/AIDS (UNAIDS, 2014).

Viral Load : The quantity of detectable viral copies in a micro-litre of Blood (Boland, 2017).

Correlates **:** This is having association, mutual relations or connection in which one factor affect or depends on the other (Rangarajan *et al*., 2016).

Patients Health Related: This are risk factors or attributes of patients that increases the likelihood of developing health complication (Musheke *et al*., 2013).

Socio Demographics Characteristics: Are defined as factors related with socio status and economic wellbeing of an individual (Burch *et al*., 2016).

Health System Factors: This are facilities or organizations factors either inside or outside the facility or organization that includes policies, legislation, people, infrastructure, commodities, staff, processes and training (Jobanputra *et al*., 2015).

ABSTRACT

Across the entire globe, 75% of people are aware of their HIV Status, at the same time 79% of the people living with HIV are now accessing anti-retroviral therapy while 81% of those people are at the same time accessing the treatment and have suppressed viral loads. Nakuru County viral suppression stands at 88.3 % (30,407) below the UNAIDS target and National target (2020). The purpose of the study was to determine the correlates of Viral Suppression in Naivasha Sub-County Hospital, Nakuru County. Specific objectives were to determine the socio-demographic characteristics associated with viral suppression in Nakuru County, to establish the patient health related correlates associated with viral suppression in Nakuru County and determine the health system correlates associated with viral suppression. A descriptive cross-sectional study was carried out in Naivasha Sub-District Hospital. The study focussed on Naivasha Sub-County Hospital which currently has 2986 clients on care. The study focused on Naivasha Sub-County Hospital which currently has 2986 clients on care with 2586 virally suppressed which is 85.0%. A Sample size of 192 clients was selected using systematic random sampling. Data was collected using questionnaires for patients and key informant interviews who managed HIV clients in Naivasha Sub-County Hospital. Analysis was analysed using SPSS (Version 24. 0): Descriptive statistics and inferential statistics (Measures of association and correlation was applied) inferential statistics which was done using logistic regression where likelihood or odd ratio was used to predict the correlates of viral suppression. The study response rate was 100.0% whereby out of 192 cohort's under study, 125 (65.0%) clients had viral load suppression below 1000 viral copies/ microliter of blood and 67 (35.0%) clients with viral load suppression above 1000 viral copies/microliter of blood. The study found the following factors to be critical predictors associated with viral load suppression; distance to facility, occupation, adherence, and co-morbidity, leadership of facility and ARV regimen. The study made the following recommendations; there is need of policy makers at County Level to develop policies that focus on client's centred management of viral load suppression. The county level should advocate to the facilities on proper use of guidelines and come up with new innovations of patient's management through evidence based approach on the existing policies. There should be improved coordination and programs ownership at facility and County level that will foster continuity of services and facilities should develop protocols on drugs sensitivity testing before changing regimen especially clients with high viral load.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

The chapter cover the background of the study which highlights the issues surrounding correlates of viral suppression in Nakuru County. It covers statement of the problem which gives a description of issues that has been addressed and to be improved which includes viral load suppression. The section contains sections such as justification of the study, limitation and delimitation as well as conceptual framework.

1.2. Background to the Study

In the entire globe there are about 36.9 million persons living with HIV/AIDS, of which children account to 1.8 million <15 years old while 35.1 Million are adults. About 5000 new infection are reported to occur every day (Avert, 2017).There has been fruitful effort in reducing HIV/AIDS morbidity and mortality to persons existing with HIV/AIDS through improved diagnosis and treatment (Maartens, Celum, & Lewin, 2014). In 2014 the UNAIDS came up with objectives intended at terminating the HIV AIDS pandemic by 2030 which was 90% of persons living with HIV to recognize their status, 90% of those who have known their status are placed on management and 90% of those on management to be virally suppressed (The Joint United Nations Programme on HIV/AIDS (UNAIDS, 2017).

UNAIDS indicates that there is uneven progress towards achievement of the 90-90-90 targets across the Countries, at the end of 2017, the entire world had reached 75-79-81 targets by year 2017, this implies that 75% persons tested knew their HIV Status and 79%

were initiated to care and treatment with ARTs while 81% had their HIV Virus suppressed (Joint United Nations Programme on HIV/AIDS, 2017).

According to the Joint United Nations Programmed on HIV/AIDS (UNAIDS, 2017), in some regions which included Asia and Pacific as well as Caribbean regions , had a task to fast-track their testing and management of HIV if they were to attain the 90-90-90 targets by 2020. There has been observation that other regions covering Eastern Europe and central Asia have registered an increments in awareness creation, but still lag behind in terms of viral testing and treatment, there has also been a notable statistics that viral suppression levels has increased in areas such as Middle East, North Africa , western and central Africa. South Africa has improved it treatment coverage which places it closer in achieving the UNAIDS target with the current target reached at 85-71-86 (The Joint United Nations Programme on HIV/AIDS (UNAIDS), 2017).

Despite altogether the challenges six countries namely Botswana, Cambodia, E-swathing, Namibia, Netherlands and Denmark have achieved the UNAIDS 90-90-90 targets Sub-Sahara Africa which is home of 12.0% of global population still account to 71% of global burden to HIV/AIDS, NASCOP statistics show that almost 90% of people who have tested positive to HIV are currently able to admittance ART, with 76.0% of people on ART achieving viral suppression (The Joint United Nations Programme on HIV/AIDS (UNAIDS, 2017).

Though there has been effort in putting Pivot antiretroviral therapy (ART), globally 81.0% have achieved viral suppression while 9% of PLHIV initiated with ARV have not achieved suppression (The Joint United Nations Programme on HIV/AIDS (UNAIDS),

2017) In Sub-Saharan Africa 76.0% of people on ART has achieved viral suppression while in Kenya, 83.1% of PLHIV on ART having achieved viral while 10.9% or 67,029 are not suppressed. Several studies have been done to explain Factors associated with HIV viral loading, (Bras et al., 2016).Some studies have cited patients socio economic background as the predictors of viral load or suppression, several studies have found the relationship between financial constraints such as cost and logistics of transports towards health facilities as a huge obstacle towards optimal adherence to ART and retention of patients in ART programs (Richardson *et al*., 2014). A study of prediction of viral suppression in 13 America Clinical sites reported that age was self-sufficiently related with high viral suppression where a median age of people who did not reach viral load suppression was 41.1 years as related to 47.1 years for persons who ensured (Jobanputra *et al*., 2015).

A study which was done in Brazil predicted that people who have joined households or married or those in dedicated relationships revealed that there was at higher odd in attaining higher viral suppression as compared to other cohort, single, widowed or in unstable relationships (Jeri *et al*., 2018). Concerning the level of education, profession and engagement in life as occupation, a study conducted in eight clinics in UK between 2011 and 2012, using cross-sectional survey method showed that education below University level, un-employment which is associated with financial hardship increase the odd of viral load by 5: 2 (Burch *et al*., 2016).

The Kenya HIV Prevalence is 5.6% but there are considerable low gains in reduction of new infections despite efforts done in scaling up HIV treatment and care. There is high incidence of HIV among women and men age 25-44 with the odds of being infected by

HIV higher in women age 15-24 attributed by new infections which calls for priority intervention to this category of population. In Kenya 1.6 million are living with HIV and 1136000 are on care by December 2017.There has been decrease in new HIV infections by 15%. The country has granulated the HIV epidemic to intensify HIV prevention efforts to prioritize geographical and population effectiveness in scaling up evidence based prevention interventions. The deaths due to AIDS related illnesses has declined since 2003 from 167000 to 58465 in 2013 and in 2014 most deaths occurred in adolescents and children representing a quarter of the deaths which occurred during the year due to HIV related illnesses as a result of low ART uptake, high mother to child transmission rate and quality of care. Retention in care at 12 months for 15-24 months is at 68% while adults are at 75% and 82% for children with retention in care at 36 months at 61%.

1.3 Statement of the Problem

Nakuru County HIV prevalence is 3.7% with an adult prevalence of 5.3% against a population of 1,959,880 consisting of male 982,505 and female 977, 375. Therefore the County has HIV burden of 49,575. Majority of PLHIV are in age bracket of 15-49 years which account to 3.4% against national HIV estimates of 3.7% (Nakuru County, 2020). The County has been classified in the category of medium incidence. The county has new infection of 1000 to 5000 persons in a year. The HIV identification is at 69% which is 34,439 people and ARV Uptake of 100% (34,463) since some PLHIV come from other Counties but however the viral suppression still stands at 88.3 % (30,407) below the UNAIDS target. There is 4,056 PLHIV with high viral load.

The study focus on Naivasha Sub-County Hospital which currently has 2986 clients on care with 2586 virally suppressed which is 85.0%. Below UNAIDS and National target of 90%.

There is a need to assess correlates associated with viral load suppression in terms of socio-demographic characteristics, patients factors and health system factors associated with viral suppression in Nakuru County focusing on Naivasha Sub-County Hospital, this is because evidenced show that the County has not met the UNAIDS target of suppression but has only succeeded in providing ART to PLHIV.

The gap in suppressing viral load is going to undermine all the other effort since people living with HIV/AIDS with high viral load will continue transmitting the virus leading to new infections. The 4,056 PLHIV with high viral load should be a major concern to the health sector in the county since they will increase the morbidity and mortality of the HIV AIDS in the county, this will also have a major impact in escalating burden in the health system in the county in term of the procurement of ARVs', other drugs and commodities as high viral load increases the chances of developing resistance to the existing ARV. The major effect of resistance to HIV/AIDS will be felt in development of opportunistic infections which end up affecting the health outcomes, productivity and quality of health care programs provided in the County.

Reduced viral suppression will worsen the health outcomes for patients which lead to easier transmission of HIV to un-infected individuals. In Nakuru County, an estimated 49,575 people are living with HIV/AIDS, 34, 436 are on care with an estimated 30,407 (88.3%) virally suppressed below the UNAIDS and National target of 90%. 4,056

(11.7%) of PLHIV in Nakuru not virally suppressed hence posing a great threat of transmission of HIV virus. There exists a research gap as to what are the correlates of HIV viral load suppression variation in Nakuru County.

1.4. Broad Objective

The broad objective of the study was to investigate the correlates of HIV Viral Load Suppression amongst HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County

1.4.1. Specific Objective

1. To determine the socio-demographic characteristics associated with viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County.
2. To find out the client's health correlates Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County.
3. To assess the health system correlates Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County.
4. To determine predictors associated with viral load suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County.

1.5 Research Questions

1. What are the socio-demographic characteristics associated with viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County?

2. What are the clients health correlates associated with viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County?
3. What are the health system correlates associated with viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County?
4. What are predictors associated with viral load suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County?

1.6 Justification

The study findings will inform policy and planning at Nakuru County. Available statistics show that Nakuru County seems not to have managed to attain the set targets by UNAIDS of HIV elimination which include diagnosis of 90% of HIV diseased persons , admission to behaviour for 90% of recognized HIV infected peoples and viral suppression amongst those introduced for treatment which is currently target of 90%. Nakuru County HIV prevalence is 3.7% with an adult prevalence of 5.3% against a population of 1, 959, 880, Male 982, 505, female 977, 375, therefore HIV burden of 49, 575.

Majority of PLHIV are in age bracket of 15-49 years which account to 3.4% against national HIV estimates of 3.7%.The County has been classified in the category of medium incidence. The county has new infection of 1000 to 5000 persons in a month. The HIV identification is at 69% which is 34,439 people and ARV Uptake of 100% (34,463) since some PLHIV come from other Counties but however the viral suppression still stands at 88.3 % (30,407) below the UNAIDS target. There is 4,032 PLHIV with high viral load. The current study focuses on viral load suppression which means that the

ARV therapy has managed to reduce a person's viral load to an undetectable level even though the person has not been cured but cannot spread the virus.

The study is beneficial because it will unravel correlates of viral load suppression in Nakuru County. Outcomes of this study if utilized and implemented will give a chance to policy makers to derive strategies that can help in managing viral load suppression. The findings will be crucial to Ministry of health both at County and County to monitor and improve quality health care using benchmarking systems based on guidelines and policies that have been provided by NASCOP to ensure quality care of HIV/AIDS patients.

1.7 Delimitation

The study focused on Correlates of HIV Viral Load Suppression in Nakuru County, which included patient's related correlates, socio-demographic characteristics and health system factors associated with viral suppression in the County. The study focused on Clients on care and treatment at Naivasha Sub-County Hospital, specifically the study focused on Clients on HIV care and treatment that were previously tested for HIV viral load in the last six months-to 1 year.

1.8 Theoretical and Conceptual Framework

1.8.1 Theoretical Framework

The study is grounded on Donabedian framework which provides tools for measuring and evaluating quality health care (Donabedian, 2005). According to Donabedian, (2005) the three components of the systems all end up in creating a certain outcomes, all related in cause and effect manner.

According to Donabedian, (2005) the three components of the systems all end up in creating a certain outcomes, all related in cause and effect manner. From Donabedian perspective structures measures effect on process while the process influence the results or outcomes. Where in the framework each of the steps in the iteration play a specific role, structure is the input which measures the attributes of the facility , service provider characteristics such as patients ratios, operating times, number of facility and quantity of medicine. A process measurement reflects the way the system functions or operate and the process and work that is done to deliver outcomes. The outcomes is the results such as reduced infections, mortality reduced, length of stay in hospital, reduced emergencies, reduced viral load, reduced admission, improved satisfaction of patients. This study will utilize Donabedian framework to assess the gap in quality health care since it.

1.8.2 Conceptual Framework

Figure 2.1 below shows how socio-demographic (age, gender, income, occupation, parity, distances), health system correlates (staffing, infrastructures, structures, commodities, leadership and guidelines) and patients health related which includes (adherence, comorbidity, psychological , substance, nutrition's , influence viral load in patients at Naivasha Sub-County, Conceptual framework is a set of many thoughts from a certain field of enquiry and can be used to set a successive presentation (Jabareen, 2017).

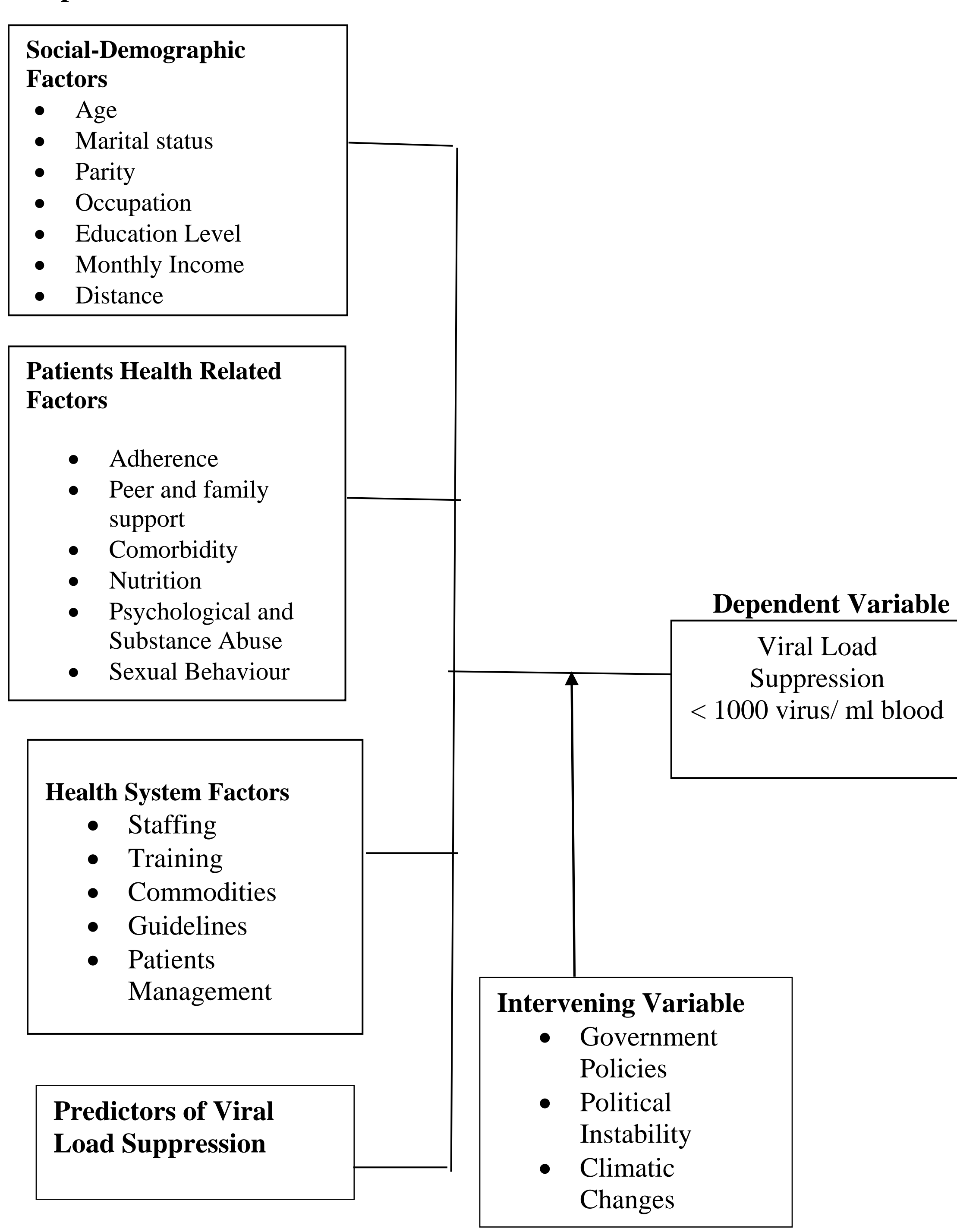

Figure 1.1: Conceptual Framework: [Source (Author, 2019)

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter reviews the literature on correlates of viral suppression and associated factors which include, socio -economic characteristics of clients visiting facilities, health system factors and patient's health related factors.

2.2 Viral Load Suppression

HIV is the virus that progresses to AIDS characterized by damaged immune system resulting to increased aids related illnesses also called opportunistic infections (Smit *et al*., 2014). There are three types of HIV Tests namely, Anti-body tests, Antigen/antibody tests and virologic tests (Fabri , 2015). Viral load test is a quantitative measure of the amount of virus in the blood, per microliter in blood, it is a preferred way of monitoring patients on ARV. Viral load is usually reported as viral copies in a microliter of blood as 1000 copies.

There are different techniques for measuring viral load which include PCR (Polymerase chain reaction) which utilizes an enzyme to multiply the HIV in the blood sample of the virus, in which if a chemical reaction occurs it indicate a positive reaction , the markers are used to measure the amount of virus, it is most preferred viral load testing method. Another method is commonly referred as Branched DNA method or BDNA, in general this is a qualitative method. Another method is called NASBA or Nucleic acid sequence based amplification, which uses viral proteins to derive a count (Phillips *et al*., 2015). CD 4 Count is an assessment that measures how robust an immune system in terms of CD4

T helper per cells /Macrophages in a micro litre of blood (Li & Gbadamosi-Akindele, 2018).

Undetectable viral load test means that there are few detectable viruses in the body for the test to detect which depend on the sensitivity of the test. Viral load test is used in the research settings, for HIV diagnosis especially during early HIV Infection, for monitoring disease progression, for monitoring efficacy of therapy. HIV treatment control replication of HIV virus hence eliminates the risk of HIV transmission. For most people on treatment respond well within 3-6 months of starting treatment as they demonstrate un-detectable viral load (Phillips *et al*., 2015). There is scientific evidence which suggest that HIV Positive people on treatment with continuous care and undetectable viral load do not transmit HIV to their sexual partners and infants (Silveira *et al*, 2015). Cryptococcal Meningitis is a is a fungal infection affecting the brain and the spinal cord (Rajasingham *et al*., 2017). This is one of the opportunistic infections affecting people living with HIV Aids and is an indication of low immunity.

According to Kenya Quality HIV Framework (2016) it emphasizes that people living with HIV AIDS before enrolled to care must be screened for presence of opportunistic infection like Tuberculosis, cancer, Hepatitis and Cryptococcal Meningitis and their CD4-Count (Rajasingham *et al*., 2017). The method for Cryptococcal Meningitis diagnosis includes clinical and laboratory tests which include testing blood for presence of Cryptococcal Meningitis antigens, culture and sensitivity. For CD4 Count, there are special CD4 Counting machines available where the normal CD4 Count is 500-1200 cells/mm^3. Those patients with CD4 of 100 and below there are screened for

Cryptococcal Meningitis as per the Kenya Anti-retro viral therapy guidelines 2018 (Phillips *et al*., 2015).

2.3 Socio Demographic Correlates and HIV Viral Load Suppression

Socio demographic factors are defined as factors related with socio status and economic wellbeing of an individual (Blumstein, 2015). Baseline so-demographic features have been shown to effect viral load suppression in clients attending facilities (Rangarajan *et al*., 2016*)*. A study of prediction of high viral load in 13 America facilities was able to establish that age of clients attending the facilities was an important predictor of viral load suppression; in this case the study found that the age associated with viral load suppression was 41.1 years as compared to the upper range of above 47.1 years (May *et al*., 2014).

A study conducted in Brazil also established that the likelihood or odd of viral suppression was found to be higher in who were single, widowed or in relationships which seems to be unstable than married (Singh *et al*., 2016). Studied done to predict the variables such as education level of clients, their occupation and employment status have established that education level is associated with socio status and work status , in one study involving 8 clinics in UK which was conducted between 2017 to 2018 using cross-sectional survey method showed that education below University level, un-employment which is associated with financial hardship increase the odd of viral load by 5: 2 (Jobanputra *et al*., 2015). However, contradicting the study is one by (Hasan *et al*., 2010), in a study in rural China found that poverty, unemployment and education of PHLIV do not predict high viral load.

In another study by (Hasan et al., 2010),carried out a study in which involved recruiting participants in seven countries, which included Cambodia, Mexico, India, USA , Pakistan, Peru and South Africa, the study was done using only qualitative tools which included the Focus Group Discussions and interview guide, the choice of qualitative data was in a bid to improve on coverage and quality of data, the study targeted PLIV amounting to 1200. The major finding of the study were that 7 out of 8 patients in the cohort were females, in another study in Canada prisons the gender was found not to matter in regards the viral suppression (Rangarajan et al., 2016). Another study carried out by May et al., (2014), found that in cohort in range of Country from Malawi, Zimbabwe and South Africa age was closely related to viral load suppression.

A study in Uganda by Penazzato et al., (2014), conducted in Busia District compared high viral load among cohort divided into Children (5-12 years), adolescent (12-15 years) and adults (20 years and above. The study used an in-depth interview to collect data. The study also found that children of the age 1-5 as well as young adolescent were significantly in high likelihood to have high viral load than any other set of age sets although other studies were converse in that (Mwau et al., 2018), in Kibra, found that older patients were more likely to achieve viral suppression. The possible reason for high viral load among children is because for children ARV dosage is difficult to monitor and to adjust dosages as they grow. It is also considered difficult to track suppression for children. Treatment for children may also be exaggerated by the types of care clients for the children as well as school environment.

Low parity and young women are more likely to be non-suppressed when equated to the rest of adult age sets, at the same time the study opposing findings were found in another

study conducted by (Maman et al., 2015) study on determinants viral suppression in Bangladeshi, parity of the woman had an association load suppression in patients initiated to ARV reported that viral load suppression improved. A study by Sang & Miruka, (2016), focusing on PLIHIV in Ugenya Sub-County, sought to find out individual socio-economic factors of patients, patients characteristics and structural factors of the hospital facilities, predicting adherence of ARV and high viral suppression. The study found that socio economic status of patients which included occupation, income group, education level and income group affects viral load. In that study cost of treatment was found to have very serious implication to treatment regime, at the same time the study found that found security was found to affect significantly adherence to HIV/AIDS and a predictor to high viral load.

Moreover a recent study V. G. et al., (2016),found that socio economic status of patients which includes occupation, income group, and education level affects their ability to adhere to treatment regime, since the cost of treatments in Botswana used to have very serious implication on outcome of HIV treatment. A study in Uganda by Kahana et al., (2015) indicated that socio economic status of patients is related with high viral load, especially food security was found to affect significantly adherence to HIV/AIDS a well as worsen it side effects. Achievement of viral load was also associated with access to health facility as factors, especially distance of patients towards health facility, with those within the range of 0-5 KM found to have best chances of adherence with an odd ratio of 3, while those within a range of 5-10 were found to adherence to ARV with odd ratio of 1. Other factors that were found to be important were HIV status to partners, stigma, and factors related with difficulties fitting the therapy in one daily life schedule.

2.4 Patients Health Related Correlates and Viral Load Suppression

A study by Bulage et al., (2017), in Cambodia found that Adherence to antiretroviral therapy is to some extent connected with viral suppression, in this case the study arrived at conclusion that over-all self-reported ART adherence was ranging at 96.3% as reported within 30 day of treatment and also it was examined that more patients reported non –suppression as compared to when the period was reduced. The conclusion of the study was that the viral load suppression may have been as a result of rigor by which the individual clients were screened to participate in the study and initiate ARV But not the conditions responsible for suppression.

Another study by Huerga et al., (2017), carried out a study in rural communities of South Africa, Kwa-Zulu Natal, using both qualitative and quantitative methods; the study utilized 400 patients and found that in almost half of participants cited issues of lifestyles, sexual behaviours as a critical factor predicting viral load. Another study by Vetrova et al., (2020), found that stigma play an important role in predicting viral load suppression. In one study carried out in Indonesia, where the study only used secondary data found that the stigma, disclosure as most important factor for viral load suppression. The disclosure was found to be having a strong correlation with viral suppression which has strong association with viral suppression.

Sullivan *et* al., (2015) studied the clinical correlation between viral load suppression and substances abuse amongst truck driver in USA such as Cigarettes and alcoholism. The study used 100 HIV positive patients who received ART, and used substances, in that study 84.0% of the respondents were abusing Cigarettes in the cohort. The study found that there was no correlation between smoking cigarettes and viral load.

Another study by Nolan et al., (2017), targeting patients living with HIV/AIDS in France, it was found that patients on ARV who admitted to daily alcohol intake had an almost four fold rise in the odds of detectable HIV viral load as compared to patients on ARV who did not use alcohol (OR=3.81, P=0.01, 95% CI=1.42-1148).In a study in Vietnam by examined reasons behind PLHIV in that Country delaying in initiation of treatment of HIV even after being diagnosed found existence of significant associations between feeling healthy, injection drug use history, work/school conflicts, detention or imprisonment, and perceived distance to clinic with late entry into Care.

In this study it is multi-morbidity is described possibility of existence of more than one conditions which can be either infectious or non-infections in nature which increases the risk factors for morbidity and mortality as well as functional impairment of clients (Zhu et al., 2017). Multi-morbidly is mostly associated with developing countries more than developed for this reason disease count burden of comorbid conditions tend to be prevalent in HIV Populations of such countries. Some studies has found that HIV viral suppression is mostly related with TB (N. et al., 2015). Several cross-sectional studies have also found no existence of relationships of incidences of TB and virologic non-suppression (Winter et al., 2018).

Self–efficacy is associated significantly with medication adherence and this is a critical accompaniment in treatment of HIV and other medical conditions, in this case adherence should be examined in terms of ability of HIV patients to undertake medication and ability of health workers to follow guidelines, protocol and plans for treatment, monitoring of HIV progression and viral load suppression. This also is related with visit indicated that self-efficacy and psychological issues were significantly related with

adherence issues, the psychological issues in this case were noted as depression, anxiety and general malaise related with patients perception of one's ability to follow medication regimen which in turns affect AR adherence, this is similarly observed by Brownetal., (2013), indicated that adherent patient have much better coping mechanisms and less depression episodes.

The ability of patients to follow through the treatment is related with their ability to adhere to prescriptions and related instruction, this is especially important in matters pertaining to HIV managements, where by lower adherence is normally associated with likelihood of reporting or scheduling health care appointments or prescriptions, this is also related with following treatment regiment, higher adherence is associated with high chance of likelihood of viral suppression.

A study by Ronen et al., (2018),conducted in Nairobi aimed at assessing whether coping self-efficacy can influence adherence by using a 26-item questionnaire to measure ones confidence in performing coping behaviours once one is with life challenges. 94.5 % of the participants indicated that they had not missed any of their pills in the previous 4 days. Some of the reasons identified for missing doses were being busy, forgetfulness, not wanting others to notice patients taking medications, feeling sick and feeling they are fine. The study found that there was a significant relationship between coping self-efficacy and adherence Ronen et al., (2018), medication side effects is an important determinant of adherence to medication especially where it come to ARV, typical medication side effects are fat redistribution, severe diarrhoea, vomiting and drug related allergies.

Other studies by Awodele et al., (2012), based in Cameroon, Nigeria, Niger established a wide range of factors able to be associated with HIV Treatment and which has ability to bring different outcomes. The issues of adherence of medication despite side effect Poor adherence can also be due to barriers pertaining to beliefs/perceptions, about medications. These barriers include real or anticipated side effects, complimentary treatment and following strict or complex regimes, different dosage, frequency of change of medication as well as disclosure of status was not associated with viral suppression in different settings. Naidoo et al (2018), undertook a study in Kwa Zulu Natal South Africa and found that BMI Was associated with mortality in infected patients initiating ART and viral load suppression.

2.5 Health Systems Correlates and Viral Load Suppression

Health systems consist of structures and processes whose primary objective is to promote, restore and maintain health. These sets of systems are the main determinant of health as they provide as they play a direct role in improving health care outcomes(Smith & Hanson, 2012). Health systems factors include status of health care facilities, commodities, health care legislation, standards, policies, regulations, resources (which includes fiscal, human facilities and sites as well as education of health workers (Oyomopito et al., 2010).

A Brazilian study showed that different level of structures, infrastructure and commodities affect diagnostic activities of a facility (Pascom et al., 2014). A recent published medical journal L'Engle et al., (2015), showed a clear correlation between HIV viral load incidence and how ready facilities are to manage Quality HIV care. The most important health system factors in relation to PLHIV were found to be the infrastructure,

geographic location, commodities and hospital protocols and procedures. The study also found that visibility and leadership within the facility as a critical factors for quality health care.

Studies by Grau et al., (2017), is also considered as important from clinicians perspective in that it is engaged in finding out important determinants of HIV health care. In this study a set of clinicians were subjected to qualitative tools which involved both clinicians working on schedule and those who were off the duty, the goal of study was to find of the most critical health system factors that make a facility to offer environment which ensure viral suppression likelihood is increased. The study found that staff training to handle HIV care, availability of commodities, infrastructure, following protocols and regulations as being important in ensuring HIV care quality is assured.

Studies by Amstutz et al., (2018), show that health system factors also comprise of protocols and procedures helps managers of health facilities to perform periodic assessment, improvement, and benchmarking the processes that happens in health care facility. The protocols or guidelines for HIV/AIDS quality management seek for interventions to improve, help to identify linkages to care as well as intervention to increase coverage of care and treatment for viral overload and opportunistic infections. The goals of guidelines and protocols are to reduce loss across the diagnostic to treatment continuum and overall improvement of health outcomes. Despite all this effort to create guidelines for use to ensure quality assurance in health care to HIV/AIDS patients the utilization of the guidelines is still at infancy level in many Countries.

The study done through World Health Organization by O. G. et al.,(2017), has found that HIV Viral load suppression is associated with facilities which has excellent access to health care, critical governance, high satisfaction of health workers, socio consecutiveness in work place and work ration. Health care facilities should utilize guidelines and protocols in order to understand policies gap relative to WHO, UNAIDS framework for quality health care for HIV/AIDS in order to create assurance of service delivery, standardizations and create room for benchmarking with best practices of quality care.

Nevertheless, indication on the conversion of global guide-lines and national-level HIV rules into practice at the health facility level is incomplete despite the fact that facility-level practices will sway health outcomes through various pathways including provision access and coverage, quality of care, coordination of care and patient tracking, support to PLHIV and medical management. Understanding HIV policy gaps relative to WHO commendations, as well as contradictions between national level program and training, would be useful for representatives troubled with enlightening HIV service.

2.6 Predictors of Viral Load Suppression

Predictors are factors that are known to have a strong direct effect on the dependent variable (Edwards & Lambert, 2007). Amongst socio-demographic factors, occupation of HIV positive adults under study was found to have highest impact in viral load suppression. Amongst client health factors the best predictor was client's ability to Adherence to ART treatment which was found to predict variation in viral load suppression in the study area. Amongst health system factors infrastructure/ART regimen was found to be the most critical predictor of viral load suppression Moreover a recent

study V. G. et al., (2016), found that socio economic status of patients which includes occupation, income group, and education level affects their ability to adhere to treatment regime, since the cost of treatments in Botswana used to have very serious implication on outcome of HIV treatment. A study by Bulage et al., (2017), in Cambodia found that Adherence to antiretroviral therapy is to some extent connected with viral suppression, in this case the study arrived at conclusion that over-all self-reported ART adherence was ranging at 96.3% as reported within 30 day of treatment and also it was examined that more patients reported non –suppression as compared to when the period was reduced. A recent published medical journal L'Engle*et* al.,(2015),showed a clear correlation between HIV viral load incidence and how ready facilities are to manage Quality HIV care. The most important health system factors in relation to PLHIV were found to be the infrastructure, geographic location, commodities and hospital protocols and procedures. The study also found that visibility and leadership within the facility as a critical factors for quality health care.

2.7 Intervening Variables

Intervening variables are deemed to have a strong contingent effect on the relationship between independent variables and dependent variable (Edwards & Lambert, 2007). Intervening effect occurs when a third variable changes the relationship between two related variables. Lai (2013), says that an intervening variable is an independent variable that affects the strength of the relationship between another independent variable and an outcome variable (independent variable).In this research three government or ministry of health policies, climatic changes and political instability. Guidelines that manages

treatment and management of HIV patients are bound to change regularly which is beyond the control of health facility or individual clients (Edwards & Lambert, 2007). Kenya HIV Quality improvement framework document which is in consistent with the Kenya Quality Model for Health KQMH, other HIV National guidelines ensures safety and Quality in HIV service provision providing norms, standards, protocol, and guidelines for continuous quality improvement to service delivery points. Kenya ART guidelines 2018 classifies HIV patients into stable and unstable classification in which unstable patients exhibit several treatment challenges like any of the following features on ART in <12 months, any active opportunistic infection, poor adherence to clinic visits, resent detectable levels of viral load, not completed 6 month of IPT, pregnancy or Breastfeeding, BMI <18 and age below 20 years. Stable patients do not have these characteristics; the unstable patents have several public health risks contributing to morbidities and mortalities as a result of drug resistance, poor viral load suppression and presence of opportunistic infections which contribute to further spread of HIV virus and poor health outcome.

The new ART guideline has also come up with specific minimum package of HIV care to several categories of patients. The study examines the correlates of viral load suppression which are classified in terms of socio-demographic characteristics of patients, clients health related factors as well as health systems factors and how they correlates with viral suppression (Lai, 2013). Political stability or climate is the shape of current state of political environment in the Country or region. Instances of violence end up in displacement of people from one region to another which has severe consequences in management of clients living with HIV. Another intervening variable is climatic changes

which can lead to displacement including flooding. In the event of such an occurrence the management of patients can be disrupted which may end up affecting HIV viral load suppression (Lai, 2013).

2.8 Summary and the Gap

Most of studies done are outside the Sub-Sahara Africa which is home of 12.0% of global population still account to 71% of global burden to HIV/AIDS, NASCOP statistics show that almost 90% of people who have tested positive to HIV are currently able to access ART, with 76.0% of people on ART achieving viral suppression (UNAIDS, 2017).

Similarly, the studies that have covered specific aspects of correlates that are associated with viral load suppression while the current study is holistic in that it covers health system factors, patients' factors and socio-demographic factors associated with viral load suppression. The current study utilized Kenya HIV Quality framework, ART Guidelines and Kenya HIV Aids Framework as reference.

CHAPTER THREE: METHODOLODY

3.1. Introduction

The chapter contain sections organized with the following subheadings, study design, target population, variables, target population, study area, inclusion criteria and exclusion criteria, sampling size and pretesting of tools, data analysis and ethical considerations.

3.2 Study Design

The study utilized descriptive cross sectional study design. This is a research design in which the phenomena or condition been measured is undertaken at a certain specific point in time for the desired population (Kothari, 2013). The study was carried out in Naivasha Sub-County Hospital

3.3 Study Population

Study population comprises of elements, items, people who will possess information the study sought to probe. Study population refers to sets of elements which form the sources of the inferences of the study (Kothari, 2013). In this study the population of the study were adult HIV positive Clients in Naivasha Sub-County Hospital. The target population were Clients on HIV care and treatment at Naivasha Sub-County Hospital. The study also targeted key informants who manage HIV patients in Naivasha District Hospital.

3.4 Variables

Dependent variables was viral load suppression, while independent variables were resources required to sociodemographic factors, Patient's factors and health system factors.

3.5. Study Area

The hospital is situated along the Nairobi, Nakuru High Way. It draw it catchment population from entire Naivasha Sub-county and other Neighbouring Counties such as Kiambu, Nyandarua and Narok. It has a bed capacity of 247 beds for adults and children and 37 for infants. It provides specialized care and routine with several health workers skill mix. HIV care is amongst the services provided. Nakuru County HIV prevalence is 3.7% with an adult prevalence of 5.3% against a population of 1,959,880 consisting of male 982,505 and female 977, 375. Therefore the County has HIV burden of 49,575. Majority of PLHIV are in age bracket of 15-49 years which account to 3.4% against national HIV estimates of 3.7% (Nakuru County, 2020). The County has been classified in the category of medium incidence. The county has new infection of 1000 to 5000 persons in a year. The HIV identification is at 69% which is 34,439 people and ARV Uptake of 100% (34,463) since some PLHIV come from other Counties but however the viral suppression still stands at 88.3 % (30,407) below the UNAIDS target. There is 4,056 PLHIV with high viral load.

The study focus on Naivasha Sub-County Hospital which currently has 2986 clients on care with 2586 virally suppressed which is 85.0%. Below UNAIDS and National target of 90%.

3.6. Inclusion Criteria

The study focused on adults HIV Clients above 18 years who were on care and treatment for the last 6 months and above. This was important because their viral load had been monitored at least once during their period of treatment in the health facility. The study also ensured that it was only those who gave consent had an opportunity to participate in

the study. The study included key informants who were HIV/AIDS care providers in the facility.

3.7 Exclusion Criteria

The study did not focus on those patients who were not above 18 years, not HIV positive, not on care and treatment and those who declined to participate in the study. The study excluded key informants who were not HIV/AIDS care providers in the facility.

3.8 Sampling Technique

Sampling is that part of a statistical practice which concerns the selection of individual observations intended to yield some knowledge about a population of concern, especially for the purposes of statistical inference (Ghoshi, 2002). The most straight forward type of frame is a list of elements of the population preferably the entire population with appropriate contact information. According to Kothari (2006), sampling provides a valid alternative to a whole population because surveying an entire population may lead to budget, time constraints and delay result analysis.

Random sampling was used to select the 192clients where each individual was chosen entirely by chance and had equal chance or probability of being selected. These clients had the same characteristics including being adults HIV Clients above 18 years and on care and treatment for the last 6 months and above

The researcher purposefully picked key informants from the facility since they had requisite knowledge and information about HIV/AIDS care management.

Table 3.1 Sampling Frame

Target Population	Study Population	Sample Size	Sampling Technique
Clients	2986	192	Random sampling
Health workers	7	7	Purposive

3.9 Sampling Size Determination

Sample size was determined by Fisher et al., (1998) to determine sample for clients in Naivasha Sub-District Hospital. Currently they are 2,986 clients

$$n = \frac{z^2pq}{d^2}$$

Where; n is the desired sample size

Z= is the standard deviation value (1.96) at 95% confidence interval

p= Proportions of the target population estimated to have the study characteristics. Patients under treatment in Naivasha Sub-District Hospital

Therefore; 1.96 x 1.96 x 0.85 x 0.15/0.05 x 0.05 (where 85% is viral suppression rate in the study site)

$$n = \frac{(1.96)^2(0.85)(0.15)}{(0.05)^2}$$

=195

Since our target population is <10,000, this study further adopted the Saunders *et al*. (2009) formula; where a final sample estimate (nf) is calculated by;

Sample size, $n_f = \frac{n}{1+\frac{n}{N}}$

Where;

n_0 = the sample size derived from the formula adopted by Fisher *et al* (1998);

N = the population size (2,986)

Therefore,

$$n = \frac{195}{1 + \frac{(195-1)}{2986}}$$

=183 + (5% for non-respondents)

183+9=192 clients

N=192

3.10. Data Collection and Management

For Quantitative data questionnaires were administered to clients. The questionnaires mainly comprised of quantitative data questions (closed ended) but however, qualitative data questions (open – ended) were also embedded to the quantitative questions. Open ended qualitative data questions which were contained in a separate interview schedule health (only) was used so as to enable the researcher to collect nominal data which stood out to be more reliable about the respondents opinion of the clients. The researcher also issued interview guide for health workers in the facility.

Data collection by way of an interview with participants provides a straightforward and a direct approach of collecting data which is detailed and well-tailored to the research question; thus suitably addressing a phenomenon.In this study, a face-to-face interview questions were designed to probe for clarity and feelings on related research concerns based on the research questions. Data collection also involved review of client's medical records about initial viral load, current viral load confirmation from HIV viral load

database from computer, patients cell phone, request form/ patients card and personal patients disclosure, CD-4 Count and BMI which was used to categorise viral load suppression, immunity and nutritional status. This also involved review of previous records which included check list of facilities and their inventories which include level of staffing, quantity of HIV Commodities.

3.11 Reliability of Research Instruments

Reliability is described as the level to which outcomes are dependable over a period of time and are correct illustration of the total population being studied. If the outcomes of an investigation can get replicated using a comparable methodology, the tool then can be regarded as reliable (Mugenda and Mugenda, 2009). The test utilized reliability test referred to as Cronbach's alpha which was arrived at using the scale produced in the questionnaire. The following formulae was used for determination of the Cronbach alpha coefficient.

$$r_{11} = \left[\frac{k}{(k-1)}\right]\left[1 - \frac{\sum \sigma_b^2}{\sigma_t^2}\right]$$

r= Equivalent reliability

k= Number of items

k-1= Covariance between Xi and Xj

alpha= Item variances and inter-item covariances

This was calculated using SPSS 26.0 Cronbach alphafunction that calculates the reliability coefficient based on the formulae as shown above. From the analysis a

Cronbach alpha coefficient in this research was 0.850. This implies that the coefficient had a value of more than 0.6which generally indicated satisfactory internal consistency reliability. These similarly mean that questionnaire items had a high reliability and internal consistency.

3.12 Validity of Research Instruments

Validity refers to the degree to which an instrument measures what it is supposed to measure (Kothari, 2013). The questionnaire items were formulated based on the problem being studied in order to maintain relevance and consistency to the problem. The researcher analysed the content and the objectives of the study to ensure that they are a representative of the universe items to be studied. This type of validity was called content validity. The researcher sought expert advice from supervisors and colleagues to ensure that the instruments have content validity. To ensure face validity of the questionnaire, the researcher guaranteed that the format of the questions were attractive to the respondents, making them short and concise. The questionnaire had reasonable number of pages.

3.13 Pretesting of Research Instruments

According to Burns and Grove (2003), pretesting is often defined as “smaller version of a proposed study, and is conducted to refine the research instruments”. A pretesting allows the researcher to test the prospective study and is done on a small number of respondents having characteristics similar to those of the target respondents.

The pretesting helps to identify possible problems in the research instruments and allows the researcher to revise the instruments before the actual study, in other words to improve

the success and effectiveness of the study (De Vos et al 2005). The pre-test questionnaires were administered to 10 clients and 2 key informants who were health workers providing HIV care in Langalanga sub county hospital in Nakuru County. After pre-testing the tools, the researcher reviewed them and made necessary modifications.

3.14 Data Analysis

Data was entered in Excel sheet and exported to SPSS for analysis, which included: Descriptive statistics and inferential statistics (Measures of association and correlation was applied) inferential statistics which was done using logistic regression where likelihood or odd ratio was used to predict the correlates of viral suppression which was first identified using cross tabulation with chi-square of some set of factors with viral suppression. Dependent variable was viral load suppression which is amount of virus in the blood, per microliter in blood, the study categorised viral suppression in to two, viral suppressed (VL<1000 copies/ml of blood and non-suppressed (VL>1000 Copies/ml of blood.

3.15. Ethical Considerations

This included proposal approval from Kenyatta University Graduate School who gave Clearance to carry on the research which was preceded by seeking authorization by Kenyatta University ethical committee, the research obtained permit from National council of science and technology (NACOSTI) and finally the sought permission from boards of Naivasha Sub-District Hospital. Letter of consent was obtained from each of participants who authorized the research to take their personal medical data for the research, The researcher assured all the participants of confidentiality and that data was used only for the purpose it was intended which is academic prose only.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter presents the results of the findings of the research study. The purposes of the study were to examine Correlates of HIV Viral Load Suppression Amongst HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County, Kenya. The specific objectives of the study was; to determine the socio-demographic characteristics associated with viral load suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County, to establish the client's health correlates Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County and to determine the health system correlates Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County. The chapter presents the data analysis by the objectives; the data analysis consist of descriptive analysis for specific objective, bivariate analysis which consist of cross tabulation and chi-square for correlates of viral load and multivariate analysis which consist of odd ratio to demonstrate the relationships and the association of the variables being studied.

4.2 Response Rate

The study targeted 192clients at Naivasha General Hospital, and key informants from the facility, who included facility manager, adherence coordinator, HIV program coordinator in the hospital and Sub-County level and health service providers in the facility. The findings are as shown in Table 4.1

Table 4.1 Response Rate

Respondents	Research Tools issues	Research Tools Returned	Percentage
Clients	192	192	100
Staff	7	7	100
Total	**199**	**199**	**100**

The findings on Table 4.1 show that the response rate for the study was 100% for both clients and staffs .This high response rate is attributed to the fact that the research fitted in existing health system function and so the research process was not seen as different activity that may cause delay in service provision.

4.3 Characteristics of Participants

The respondent's demographic information for clients questionnaire constituted gender, age, marital status, parity, occupation, education level, monthly income, distance from home to facility while for staff demographic it consisted of gender, age, marital status professional qualification, number of years in facility and position held in the facility. Table 4.2 and 4.3 show the breakdown of the respondent's demographic information.

Table 4.2 Socio-Demographic Characteristics of the Respondents

Demographic Information		Frequency	Percentage
Sex	Male	80	41.7
	Female	112	58.3
Age	18-25 Years	18	9.4
	26-35 Years	52	27.1
	36-45 Years	61	31.8
	46-55 Years	38	19.8
	56-65 Years	13	6.8
	66-75 Years	4	2.1
	Over 76 Years	6	3.1
Marital Status	Married	100	52.1
	Single	61	31.8
	Divorced	14	7.3
	widowed	17	8.9
Parity	1-2 children	65	33.9
	2-4 children	42	21.9
	4-5 Children	70	36.5
	Over 5 Children	3	1.6
	none	12	6.3
Occupation	Formal	43	22.4
	Informal	138	71.9
	Jobless/Housewife	11	5.7
Education	Primary Education	105	54.7
	Secondary Education	64	33.3
	College Education	18	9.4
	University Education	2	1.0
	no education	3	1.6
Income	1-5000	94	49.0
	5000-10000	54	28.1
	10000-20000	20	10.4
	20000-50000	10	5.2
	Above 50000	3	1.6
	No income	11	5.7
Distance to Facility	Less than 5KM	59	30.7
	5 KM	27	14.1
	Over 5 KM	106	55.2

n=192

The gender of HIV positive client's respondents shows that most of the participants were female at 58.3% as opposed to male at 41.7%. Based on the findings it was established that there was no major discrepancy between male and female HIV Positive clients. Concerning age the study found that most of participants at the time of study were in the age bracket of between 36-45 years accounting to 31.8%, followed by those in age bracket 26-35 years accounting to 27.1% and the least is above 66 years which were 5.2%. The mean age of participants was 41 years (Inter quartile range (IQR) =32-49 years. This means that majority of HIV positive clients in the study area lies under the age bracket of 32-49 years. Majority of the respondents were married 52.1%, while singles accounted for 31.8%, minority were either widowed (8.9%) or divorced (7.3%). Most of participants accounting to 36.5% had 4-5 children, followed by 1-2 children accounting to 33.9% while minority had over 5 children accounting to 1.6%.

Regarding occupation about majority of cohort were in informal sector accounting to 71.9% which consisted of people working in flower farms, fishermen, business and farmers in the study area, followed by people working in formal public sector accounting to 22.4% and least were not employed or students (5.7%).

Concerning academic background majority of HIV positive clients in the study area had acquired basic primary education accounting to 54.7%, followed by 33.3% who had completed secondary school. Minority of cohort had acquired tertiary education.

On the income background of clients most 49% have an income of 1-5,000, followed by 5,000-10,000 accounted for by 28.1%, minority indicated to be earning above 20,000. This means that majority of respondents are living below poverty line (Below 1 Us

Dollar) per day. Majority of clients said they live above 5 KM from health facility accounting to 55.2%, while minority said they live less than 5 KM to the health facility accounting to 30.7%. This means that majority of HIV Clients who seeks HIV care live above 5 KM. This is against the WHO recommendation access to health care services of less than 5 KM.

Table 4.3: General Characteristics Distributions Staff from the Study

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	3	42.9
	Female	4	57.1
Age	30-39 years	4	57.1
	40-49 Years	1	14.3
	Above 50 Years	2	28.6
Marital Status	Married	5	71.4
	Single	2	28.6
Professional Qualification	Post Graduate	1	14.3
	Under Graduate	1	28.6
	Diploma	1	57.1
Years in Health Sector	4-10 Years	3	42.9
	11-15 Years	2	28.6
	Above 15 Years	2	28.6
Position held currently in this facility			
	Facility Manager	1	14.3
	HIV Coordinators	3	42.9
	Clinical Officer	1	14.3
	Nurse	2	28.6
Years of service in this facility	4-10 Years	3	42.9
	11-15 Years	2	28.6
	Above 15 Years	2	28.6
Types of Employment	Contract	5	71.4
	Permanent and Pensionable	2	28.6
	n=7		

The gender of staffs in the study area who consisted of included facility manager, coordinator of HIV program in the hospital and service provider were female at 57.1 % as opposed to male at 42.9 %. Based on the findings it was established they were more female staffs than male. Concerning age the study found that most of staffs at the time of study were in the age bracket of between 30-39 years accounting to 57.1 %, more than other age brackets. Majority of the respondents were married 71.4%, while singles accounted for 28.6%. Regarding professional qualification staff had minimum of diploma (57.1%), with the highest qualification being post graduate. Concerning years of service in the health sector it was even distributed between 4-10 years, 11-15 years and above 15 years. Majority of the staff indicated they work under contract accounting to (71.4%). The respondents were facility managers, HIV Coordinator and clinical officers. This was deduced to mean that the staff who participated in the study had enough experience working in health sector as well as requisite education background that implies they could be relied upon to participate in the study on correlates of viral load suppression amongst patients living with HIV Virus in the study area.

4.4 HIV Viral Load Suppression amongst HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County

The dependent variable of the study was about HIV Viral Load Suppression in Naivasha Sub-County Hospital in Nakuru County. Figure 4.1 indicates the frequency distribution and percentages of HIV viral load suppression amongst HIV positive adult's clients on care in the study area.

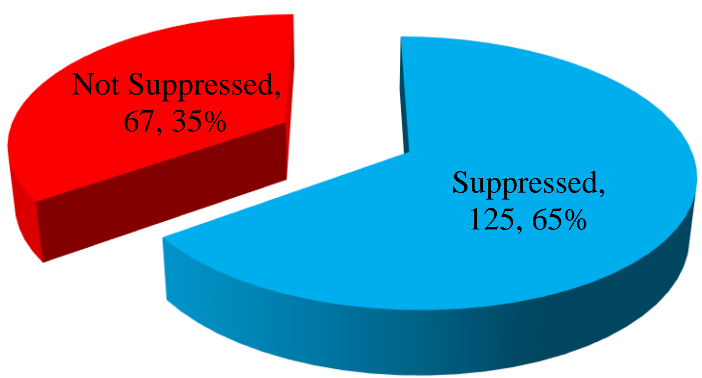

Figure 4.1 HIV Viral Load Suppression

The study established that out of 192 clients recruited for the study who are accessing HIV Care in the facility, 125(65.0%) were found to have less than 1000 viral copies/microliter of blood while 67 (35.0%) were found to have more than 1000 viral copies/microliters of blood. Figure 4.1 and 4.2 show the trend of viral load work load and suppression whereby VL 2018 was average 80.9 while 2019 up to October was 82.7%. The findings show that the facility viral load suppression is Below UNAIDS and National target of 90%.

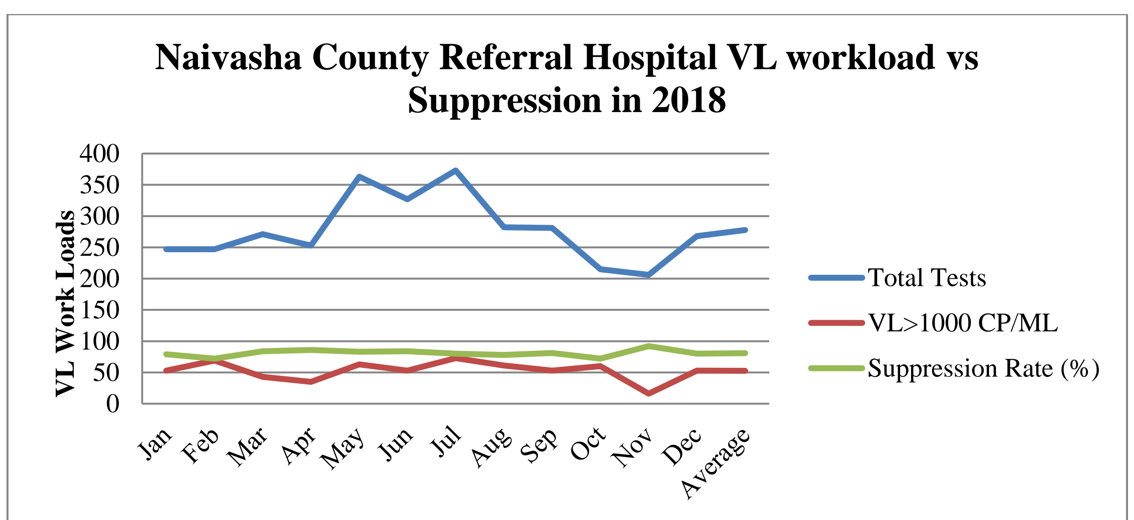

Figure 4.2: Naivasha County Referral Hospital VL workload vs. Suppression in 2018

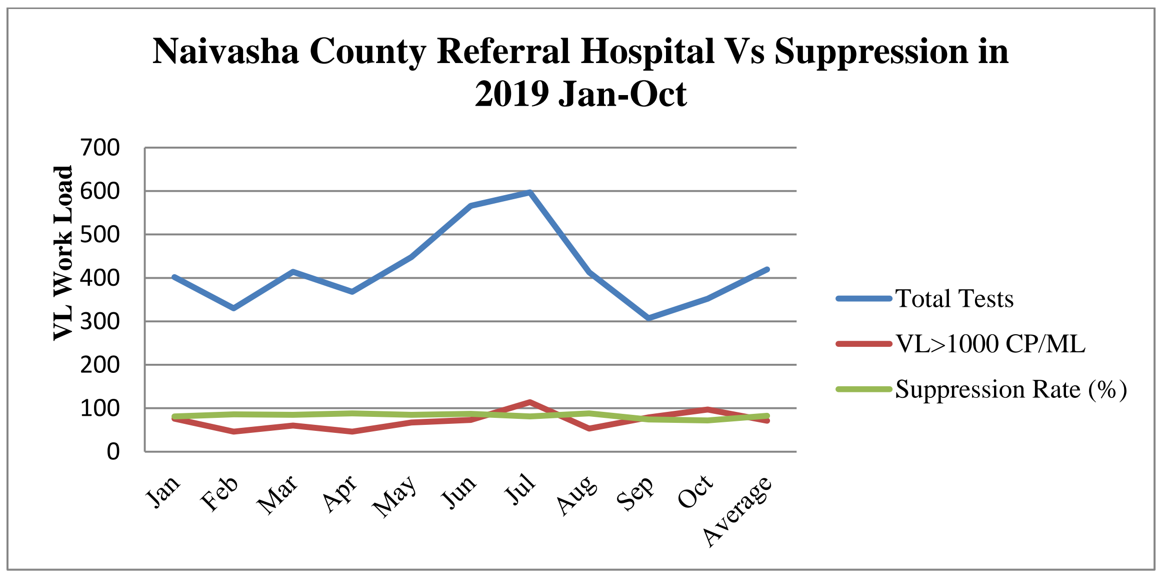

Figure 4.3: Naivasha County Referral Hospital VL workload vs. Suppression in 2018

4.5 Socio-Demographic Characteristics Associated With Viral Load Suppression

The section contains the analysis of first objective of the study which was to determine the socio-demographic characteristics associated with viral suppression among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County. They included; gender, age, marital status, parity, occupation, education level, monthly income and distance from home to health facility. This was done by bivariate analysis using cross tabulation and chi-square and multivariate analysis where odd ratio analysis was used. This was done in order to draw conclusion whether there was an association between socio-demographic factors and viral suppression among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County. The cross tabulation and chi-square are in section 4.5.1 while odd ratios are in section 4.5.2.

4.5.1 Age and Viral Load Suppression

The study sought to establish age distribution of adults HIV positive clients utilizing HIV services in Naivasha County Hospital. The study found that there was no difference of adults HIV positive clients with over more than 1000 viral copies/microliter of blood and less than 1000 viral copies/ microliter of blood based on age bracket. The chi square results were $\chi 2$= (6, N=192) =6.482, P=0.371). The p value was more than .05 which means that age was not significant correlates of viral suppression among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County. The degree of freedom is equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degrees of freedom is (7-1) (2-1) = 6. The findings are as shown in Table 4.4.

Table 4.4: Age and Viral Load Suppression

Variable Age	What is your current Viral Load Today?				Chi Square χ^2	DF	P value
	Suppressed		Not Suppressed				
	F	%	F	%			
18-25 Years	12	9.6	6	9.0%			
26-35 Years	33	26.4%	19	28.4%	6.482	6	0.37
36-45 Years	44	35.2%	17	25.4%			
46-55 Years	22	17.6%	16	23.9%			
56-65 Years	6	4.8%	7	10.4%			
66-75 Years	2	3.2%	2	3.2%			
Over 76 Years	4	3.2%	2	3.2%			
Total	**125**	**100**	**67**	**100**	**n=192**		

4.5.2 Gender and Viral Load Suppression

The study sought to establish gender distribution of adults HIV positive clients utilizing HIV services in Naivasha County Hospital. The study found that there were 56.0% female adults HIV positive clients with less than 1000viral copies/microliter of blood while male were at 44.0%.At the same time there were more 62.7% adults HIV Positive with more than 1000 viral copies /microliter of blood than male at 37.3%. The chi square results were χ^2= (1, N=192) =6.90, P=0.370). The study found that p-value was at 0.370. This showed that p value was greater than .05 which indicated that gender was not a significant correlates influencing viral suppression among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County.

The degree of freedom is equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degrees of freedom is (2-1) (2-1) = 1. The findings are shown in Table 4.5

Table 4.5 Gender and Viral Load Suppression

Variable							
Gender	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
	Suppressed		Not Suppressed				
	F	%	F	%	6.90		
Male	55	44.0	25	37.3%		1	0.370
Female	70	56.0	42	62.7%			
Total	**125**	**100**	**67**	**100**			**n=192**

4.5.3 Marital Status and Viral Load Suppression

The study sought to establish marital status of adults HIV positive clients utilizing HIV services in Naivasha County Hospital. The study found that there almost equal proportion of married adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 53.7% and those with less than 1000 viral copies/microliter of blood. Similarly the proportion of clients with viral load greater than 1,000 copies/microliter of blood and less than 1,000 viral copies /microliter of blood did not differ for adults HIV Positive clients who were single, divorced and widowed. The chi square results were χ^2= (3, N=192) =7.13, p=0.219). The study found that P value was at 0.219. This showed that p value was greater than .05 which indicated that marital status of adults HIV positive clients understudy was not a significant correlates influencing viral load suppression. The degree of freedom is equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degrees of freedom is (4-1) (2-1) = 3. The findings are in Table 4.6.

Table 4.6: Marital Status and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	P value	DF
Marital Status	Suppressed		Non Suppressed				
	F	%	F	%			
Married	64	51.2	36	53.7	7.13	.219	3
Single	44	35.2	17	25.4			
Divorced	6	4.8	8	11.9			
Widowed	11	8.8	6	9.0			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.5.4 Parity and Viral Load Suppression

The study sought to establish parity of adults HIV positive clients utilizing HIV services in Naivasha County Hospital. The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 68.7% for family with more than 4-5 children than any other groups. Similarly the proportion of clients with viral load greater than 1,000 copies/microliter of blood and less than 1,000 viral copies/microliter of blood seemed to differ significantly based on household size. The chi square results were χ^2= (4, N=192) =11.55, p=0.000). The study found that p-value was at .000. This showed that p value was less than .05 which indicated that parity of adults HIV positive clients understudy was a significant correlates influencing viral load suppression.

The degree of freedom is equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degrees of freedom is (5-1) (2-1) = 4. The findings are as shown in Table 4.7.

Table 4.7Parity and Viral Load Suppression

Variable							
Parity	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
	Suppressed		Not Suppressed				
	F	%	F	%	11.55		
1-2 Children	49	39.2	16	23.9		4	.000
2-4 Children	39	31.2	3	4.5			
4-5 Children	24	19.2	46	68.7			
>5 Children	2	1.6	1	1.5			
None	11	8.8	1	1.5			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.5.5 Occupationand Viral Load Suppression

The study sought to establish occupation of adults HIV positive clients utilizing HIV services in Naivasha County Hospital. The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 50.4% for clients working in informal sector than formal sector. Therefore the differences based on occupation seemed to differ significantly. The chi square results were χ^2= (2, N=192) = 9.336, p=0.032). The study found that p-value was at .032. This showed that p value was less than .05 which indicated occupation of adults HIV positive clients understudy was a significant correlates influencing viral load suppression.

The degree of freedom is equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degrees of freedom is (3-1) (2-1) = 2. The findings are as shown in Table 4.8.

Table 4.8 Occupation and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Occupation	Suppressed		Not Suppressed				
	F	%	F	%			
Formal	54	94.7	3	5.3	9.336	2	0.032
Informal	61	49.6	62	50.4			
Jobless/Housewife	10	83.3	2	16.7			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.5.6 Educationand Viral Load Suppression

The study sought to establish education status of adults HIV positive clients utilizing HIV services in Naivasha County Hospital. The study found that there was no difference in proportion of adults HIV positive clients with over more than 1000 viral copies/microliter and clients with viral load greater than 1,000 copies/microliter of blood based on education level of clients. The chi square results were χ^2= (5, N=192) =7.447, p=0.114). The study found that p-value was at 0.114. This showed that p value was greater than .05 which indicated education of adults HIV positive clients understudy was not significant correlates influencing viral load suppression.

The degree of freedom is equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degrees of freedom is (5-1)(2-1) = 4. The findings are as shown in Table 4.9.

Table 4.9: Education and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Education	Suppressed		Not Suppressed				
	F	%	F	%			
Primary	71	56.8	34	50.7	7.447	5	0.144
Secondary	42	33.6	22	32.8			
College	9	7.2	9	13.4			
University	0	0.0	2	3.0			
No Education	3	2.4	0	0.0			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.5.7 Income and Viral Load Suppression

The study sought to establish income group of adults HIV positive clients utilizing HIV services in Naivasha County Hospital**.**

The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 41.6% for clients with less income of 1-5,000 as compared to any other higher income level. Similarly the proportion of clients with viral load greater than 1,000 copies/microliter of blood and less than 1,000 viral copies /microliter of blood seemed to differ significantly based on income of clients. The chi square results were χ^2= (5, N=192) =12.33, p=0.034). The study found that p-value was at .034. This showed that p value was less than .05 which indicated that income of adults HIV positive clients understudy was a significant correlates influencing viral load suppression. The degrees of freedom are equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degree of freedom is (6-1) (2-1) = 5. The findings are as shown in Table 4.10

Table 4.10 Income and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
	Suppressed		Not Suppressed				
Income	F	%	F	%			
1-5,000	52	41.6	42	62.7	12.33	5	0.034
5,000-10,000	44	35.2	10	14.9			
10,000-20,000	13	10.4	7	10.4			
20,000-50,000	7	5.6	3	4.5			
>50,000	1	0.8	2	3.0			
No income	8	6.4	3	4.5			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.5.8 Distance to Facility and Viral Load Suppression

The study sought to establish distance to facility of adults HIV positive clients seeking HIV services in Naivasha County Hospital**.** The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 64.2% for clients who live at a distance of more than 5 km as compared to those who live either within 5 KM or less. Similarly the proportion of clients with viral load greater than 1,000 copies/microliter of blood and less than 1,000 viral copies /microliter of blood seemed to differ significantly based on distance of home to facility. The chi square results were χ^2= (5, N=192) =11.88, p=0.045). The study found that p-value was at .045. This showed that p value was less than .05 which indicated that distances of home to facility of adults HIV positive clients understudy was a significant correlates influencing viral load suppression.

The degree of freedom is equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degree of freedom is (3-1) (2-1) = 2. The findings are as shown in Figure 4.11

Table 4.11 Distance to the Facility and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Distance	Suppressed		Not Suppressed				
	F	%	F	%			
< 5 KM	46	36.8	13	19.4		2	0.045
5 KM	16	12.8	11	16.4	11.88		
Over 5 KM	63	50.4	43	64.2			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.5.9 Socio Demographic Factors Associated with Viral Load Suppression

Multivariate analyses were employed to assess the socio demographic correlates of viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru Count. Multiple logistic regression model sought to reveal whether gender, age, marital status, parity, occupation, education level, monthly income, distance from home to facility were significant correlates of viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County.

The research utilised logistic regression in form of odd ratio (OR), which is used to measure the association between chance of exposure and the outcome. The Odd ratio is counted by comparing the likelihood of something occurring as compared to the odds of

something not occurring. In this case the research is comparing the relative odds of viral load suppression occurring or not occurring based on adults HIV Clients socio-economic characteristics which include gender, age, marital status, parity, occupations, education, monthly income and distances to health care facility. The aim is to establish whether socio-economic factors can influence magnitude or risk of viral load suppression. The validity of odd ratio is measured using a threshold of 95% confidence interval (CI) which is used to estimate the precision of the OR. A large CI is regarded as a measure of a low precision of the OR, where as a small CI indicates a higher precision of OR.

Table 4.12: Logistic Regression Analysis of Socio-Demographic Factors and Viral Suppression among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County

Variable	Odd Ratio	Lower Limit	Upper Limit	p-value
Gender				
Male	1.75	0.64	4.83	
Female	1.52	0.52	3.83	0.370
Age				
18-25 Years	0.80	0.49	13.19	
26-35 Years	0.46	0.33	5.83	
36-45 Years	1.12	0.10	12.49	0.020
46-55 Years	0.76	0.56	10.40	
Variable	**Odd Ratio**			
Marital Status				
Marriage	0.75	0.15	3.63	
Single	2.15	0.42	10.98	0.219
Divorced	0.13	0.16	1.199	
Parity	**Odd Ratio**			
1-2 Children	4.00	0.71	19.23	
2-4 Children	5.23	0.39	10.98	0.000
4-5 Children	6.13	0.31	16.00	
Over 5 Children	7.2	0.12	10.66	
Occupation	**Odd Ratio**			
Formal	5.2	0.31	8.90	
Informal	2.4	0.20	6.34	0.000
Education	**Odd Ratio**			
Primary	8.69	1.57	18.90	
Secondary	1.67	0.89	6.78	
Above Secondary	0.87	0.02	3.20	
Monthly Income	**Odd Ratio**			
1-5,000k	9.9	0.31	14.29	
5k-10,000k	4.49	1.09	13.78	0.034
10,000-20,000	1.29	0.47	8.90	
20,000-50,000	1.04	0.04	6.70	
Distance of Home to Facility	**Odd Ratio**			
Less than 5 KM	3.69	1.20	11.32	
5KM	0.86	0.23	5.135	0.045
Over 5 km	5.79	1.30	12.22	

n=192

The findings indicates that adults HIV positive female from the sampled are 1.75 times likely to have More than 1000 copies/ microliter of blood than their male counterpart 1.52,gender was insignificant and they did not influence as correlates.

The findings indicates that HIV positive clients of age bracket of over 76 years and 66-75 years are 10.3 and 8.6 more likely to have HIV viral load of more than 1000 viral copies/microliter of blood Than other age bracket counterpart (OR 10.3) for over 76 years cohort while for 66-75 bracket counterpart (OR 8.6). Widowed and divorced adult HIV positive clients were found to have higher odds of 3.07 for widowed and 1.2 for divorced of having HIV viral load of more than 1000 viral copies/microliter of blood than married and single (OR 3.07) for widowed while divorced had (OR 2.24).

The findings indicated that HIV positive adults selected for the study with either 4-5 children or more than 5 children were likely to have HIV viral load of more than 1000 viral copies/microliter of blood than family with smaller number of children (OR 5.23) for over 5 children cohort while those with 4-5 children had (OR 7.2).

The study found that HIV positive adults selected for the study with no education or primary education were twice likely to have HIV viral load of more than 1000 viral copies/microliter of blood (OR 1.94, 95% C.I = 0.75-2.35).

The study similarly found that HIV positive adults selected for the study with little income of 1-5,000 were9.9 likely to have HIV viral load of more than 1000 viral copies/microliter of blood than any other income group (OR 9.9). The study also found that HIV positive adults selected for the study who live more than 5km from the facility are more than 4 times likely to have HIV viral load of more than 1000 viral

copies/microliter of blood than those who live either within 5km or less than 5km (OR 5.02).

4.6 Clients Health Related Correlates Associated with Viral Load Suppression

The section contains the analysis of second objective of the study which was to determine the Client's health correlates associated with HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County. They included; adherence, co-morbidity, psychological, substance and nutrition.

This was done by univariate or descriptive data analysis which included frequency and percentage, Bivariate analysis using cross tabulation and chi-square and multivariate analysis where odd ratio analysis was used. This was done in order to draw conclusion whether there was an association between client's healths correlates Among HIV Positive Adults. The descriptive, cross tabulation and chi-square as well as odd ratios are in section

4.6.1 Clients Health Correlates among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County

Univariate analysis is the simplest form of data analysis where the data being analysed contains only one variable. The purpose was to find categories that the data falls into. The main purpose of univariate analysis is to describe the data and find patterns that exist within it. To describe the pattern found in univariate data involved use of frequency distribution tables and charts.

4.6.1.1 BMI (Body Mass Index) of the Adult HIV Clients

The research sought to find out the Body mass index Or BMI of adults living with HIV as a way to establish if they are at a healthy weight for their height. This was also meant to establish whether their weight is associated with viral suppression which put them also at risk to other health conditions such as Diabetes, Hypertension and Cancer and death. The findings are in Fig 4.1 and 4.2 below. The study found that the average BMI of 192 HIV clients was 22.9 while median was 22.3 which data was normally distributed since median was close to the mean. The maximum BMI was 38 while minimum was 15, 25% of cases was 19.8, 50.0% of the cases was 22.30 while 75.0% was 24.8. The peak of the data occurred at 19-20 which mean that was the most common BMI; the data spread was about 15-38. The majority of data was clustered on the left side of the histogram which means that the data in the graph positively skewed. The BMI distribution was found to be skewed to the right, with mean being greater than the mode and so was positively skewed. Kurtosis was 1.540 which was positive because the e tails was “heavier" than for a normal distribution. The kurtosis measure peakness of the data and in the case the kurtosis was normal, no extreme values

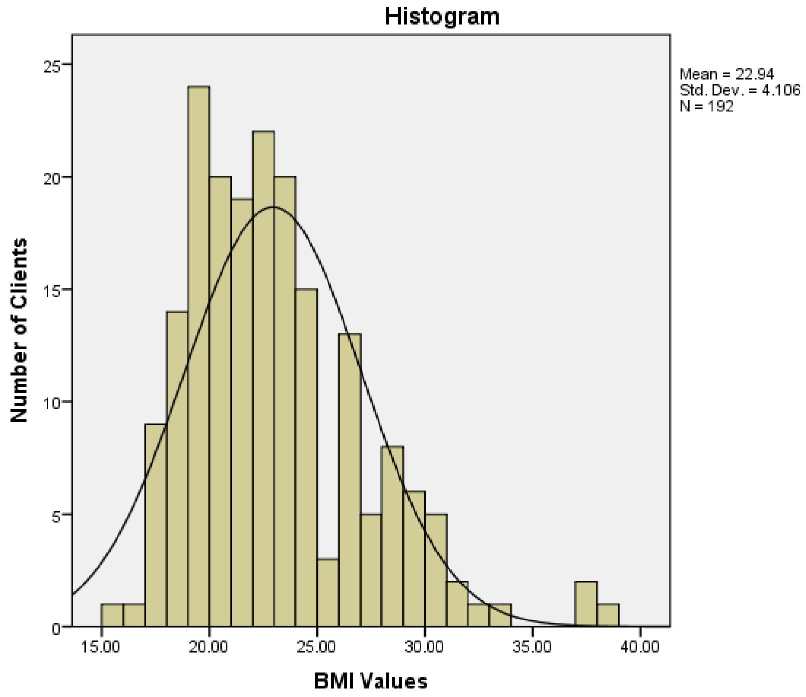

Figure 4.4: Histogram for BMI Values

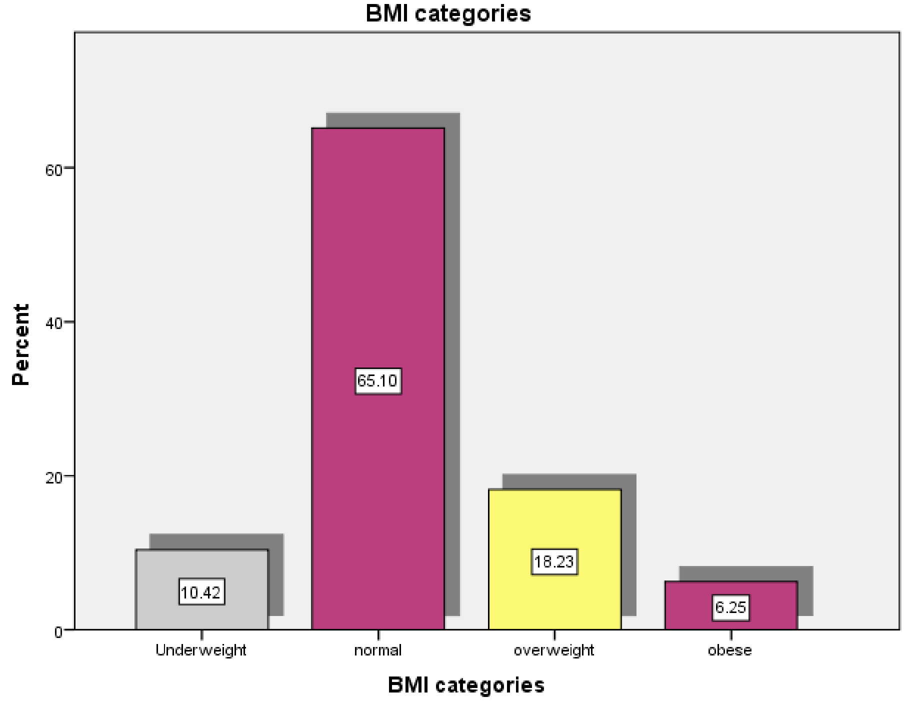

Figure 4.5: BMI Categories

The study found that most of adult HIV clients attending clinic accounting to 65.10% have normal weight which is BMI of 18.5-24.9, 10.42% of HIV adult had a BMI of less than 18.5 which is also referred to as underweight, 18.23% of clients were found to have BMI of between 25-29.9 which is also referred to as overweight while the least are those clients whose BMI was 30 or more who accounted to 6.5%.

4.6.6.2 Period Clients were Tested for HIV

The study sought to establish the period clients were tested for HIV; this was aimed at understanding the pattern of distribution of duration the clients had taken since they were tested for HIV up to initiation to HIV care. The findings in Table 4.15 indicated that majority of sampled adult HIV Positive clients accounting to 83.9% had been tested more than 1 year ago, followed by those who had been tested 3-6 months at 5.7%, 6 months to 1 year at 5.2% and less than 3 months ago at 5.2%. Therefore majority of the clients under study had lived with HIV for more than 1 year. The 5.2% were those who had previously been tested in other facility but were retested again later at the facility. The findings are as shown in Table 4.13.

Table 4.13: Period clients were Tested for HIV

Duration	Frequency	Percent
Less than 3 months ago	10	5.2
3-6 months ago	11	5.7
6 months to 1 Year Ago	10	5.2
More than 1 Year Ago	161	83.9
Total	**192**	**100.0**

4.6.6.3 Initial Viral Load after Initiation to Care

The study sought to establish the initial viral load copies in order to categorise the clients into stable and unstable and further identify specific clinical management needs of each patients. The findings are as shown in Table 4.16. The study found that out of 192 HIV positive adults under study (134) 69.8% had their initial viral load copies as less than 1000 copies/microliter of blood and therefore were stable clients however (58) 30.2% of clients had more than 1000 viral copies/microliter of blood categorised as unstable. The findings are as shown in Table 4.14

Table 4.14 Initial Viral Load after Initiation to Care

What was your last viral load copies tested?	Frequency	Percent
Less than 1000 copies/ Microliter of blood	134	69.8
More than 1000 copies/ Microliter of blood	58	30.2
Total	**192**	**100.0**

4.6.6.4 HIV Positive Status with Co-infection

The study sought to establish whether HIV positive adults under study had co-existing infections during their initial visit to the health facility when undergoing clinical evaluation and planning for initiation of HAART. The reason for examining for the presence of co-existing infection is to plan for management of the patients. This was also meant to ascertain the ability of health worker to identify co-existing infections in HIV positive clients. The study found that out of 192 Adult HIV positive clients, 109 (56.8%) said that TB was the found to be co-existing with HIV condition, followed by 12 (6.3%) said hypertension, 10 (5.2%) said Cryptococcus meningitis, 9 (4.7%) said diabetes

mellitus, 6 (3.1%) said cancer , 6(3.1%) said other condition such us pneumonia, chest problem, malaria and depression , 3(1.6) said STI, 2(1.0%) said to have been using traditional medicine. At the same time the study found that 35 (18.2% were found to have no pre-existing condition. The findings are as shown in Table 4.15

Table 4.15 HIV Positive Status with Co-Infection

Co-Existing Condition	Frequency	Percent
TB	109	56.8
Meningitis	10	5.2
Diabetes	9	4.7
Hypertension	12	6.3
Traditional Medication	2	1.0
Cancer	6	3.1
STI	3	1.6
Others	6	3.1
None	35	18.2
Total	**192**	**100.0**

4.6.6.5 HIV Positive Clients and Substance and Alcohol

The study sought to establish whether HIV positive adults under study were taking substance and alcohol during their care. According to Kenya guidelines on the use of anti-retroviral drugs for treating and preventing HIV 2018 it has been emphasized that clients on HIV care should not take alcohol and other substances as it interfere with drugs efficacy. The finding is as shown in table 4.17. The study found that out of 192 of adults HIV positive clients on care under the study 146 (76.0%) were not taking alcohol however a proportion of 46 (24.0%) said were taking alcohol. The study also found that the frequency alcohol intake varied across the period. Concerning Tobacco study found that 165 (85.90%) were not taking tobacco products however a proportion of 27 (14.1%)

said were taking tobaccos products. The study also found that the frequency alcohol intake varied across the period. On Miraa the study found that 169 (88.0%) were not taking Miraa while 23 (12.0%) which also varied in frequency of intake. Most clients were not taking marijuana and IDU.

Table 4.16HIV Positive Status and Substance Abuse

	1-2 weeks		2-4 weeks		1-2 Months		3-6 Months		None	
	F	%	F	%	F	%	F	%	F	%
Alcohol	21	10.9	10	5.2	7	3.6	8	4.2	146	76.0
Tobaccos	8	4.2	6	3.1	4	2.1	9	4.7	165	85.9
Miraa	3	2	8	4.2	7	3.6	7	3.6	169	88.0
Marijuana	13	6.8	7	3.6	3	2.6	5	2.6	164	85.4
IDU	4	2.1	7	3.6	3	1.6	5	2.6	173	90.1

n=192

4.6.6.6 Nutritional Perception

The study sought to establish whether the nutritional status of HIV positive adults on care was reasonable enough to support their adherence to treatment. According to Kenya guidelines on the use of anti-retroviral drugs for treating and preventing HIV 2018 nutrition is emphasized as one of the important interventions in improving viral load suppression during HIV treatment. The finding is as shown in table 4.18.The study found that most of adult HIV positive clients under study accounting to 59 (30.7%) reported that they were not sure whether their nutritional intake was reasonable enough to support their adherence to medicine, although 23.4%(45) and 20.8%(40) either agreed or strongly agreed that their nutritional intake was of value, 27(14.1%) either disagreed

or strongly disagreed 10.9% (21) that nutritional intake was reasonable enough to support adherence to medicine. Therefore majority of adult HIV positive clients reported to have a perception that their nutritional intake to support the drugs adherence was not sufficient (55.7%) either by disagreeing or not decided.

Table 4.17 Nutrition

Nutrition Status	Frequency	Percent
Disagree	27	14.1
Strongly Disagree	21	10.9
Undecided	59	30.7
Agree	45	23.4
Strongly Agree	40	20.8
Total	**192**	**100.0**

4.6.6.7 Sexual Behaviour: Condom Use HIV Positive Clients

The study sought to establish the likelihood of HIV positive clients on care in having sex without the use of condom during their HIV care. According to Kenya guidelines on the use of anti-retroviral drugs for treating and preventing HIV 2018 condom use is emphasized as an intervention for HIV Prevention and therefore help in preventing HIV re-infection during care which increases viral load. The findings are as shown in table 4.19.The study found that out of 192 adults living with HIV and on HIV care under study 101 (52.6%) said either they do not use condom at all or use them inconsistently during sex, only (82) 42.7% indicated they never miss using condom during sex, about 9 (4.7%) said they don’t have partners.

Table 4.18 Condom Use for HIV positive Clients

Condom Use for HIV positive Clients	Frequency	Percent
All the time	45	23.4
Some of the time	56	29.2
Never Miss	82	42.7
no partner	9	4.7
Total	**192**	**100.0**

4.6.6.8 Sexual Behaviour: Sexual Partners in HIV Positive Clients

The study sought to establish the number of sexual partners the HIV clients on care were having in their last six months during their HIV care. This was important to know their sexual behaviour in relation to HIV Prevention during their Continuum of care. The finding are as shown in table 4.20.The study found that out of 192 Adults living with HIV 140 (72.9%) said they have a single partner they were having sexual relations with during their HIV care. At the same time 39 (20.3%) said they had more than 2 sexual partners. Minority 13 (6.8%) said they don't had any active sexual partner. Therefore although majority 72.9% reported to have one sexual partner 20.3% had more than one partner in less than 6 month prior to the study.

Table 4.19 Sexual Partners in HIV Positive Clients

Partner	Frequency	Percent
	140	72.9
2-3 Partners	21	10.9
3-4 Partners	4	2.1
More than 4	14	7.3
No partners	13	6.8
Total	**192**	**100.0**

4.6.6.9 Sexual Behaviour: Sexual Transmitted Diseases in HIV Positive Clients

The study sought to find out if the HIV Positive clients were likely to have been infected with STI in the course of the care. This was important to know their sexual behaviour in relation to HIV Prevention during their Continuum of care. The findings are as shown in table 4.24.The study found that out of 192 HIV positive adults on care in the study area 76 (39.6%) had not been treated for STIs after knowing their HIV status. At the same time the study found that 61 (31.8%) had been treated for STI in the last 1-2 weeks recently before the time of the study, 20 (10.4%) had reported to have been treated for STI in the last 3-6 weeks before the study, 27 (14.1%) had reported to have been treated for STI in the last 2-4 weeks before the study. Only 8 (4.2%) indicated to have been treated for STI previously before HIV care. Therefore majority accounting to 66.3% had been treated for STI before the study in the last 1-6 weeks prior to treatment.The findings are as shown in Table 4.20

Table 4.20 Sexual Transmitted Diseases in HIV Positive Clients

Sexual Transmitted Disease	Frequency	Percent
1-2 weeks	61	31.8
3-6 weeks	20	10.4
2-4 weeks	27	14.1
None	76	39.6
Other Specify	8	4.2
Total	**192**	**100.0**

4.6.6.10 HIV Status Disclosure in Adult HIV Positive Clients on Care for Psychological Purposes

The study sought to find out if the HIV Positive adult on care has ever disclosed their HIV Status to their sexual partners or family members for psycho-social, HIV Prevention and adherence as well as other support which will contribute to HIV Viral load suppression. The findings are as shown in table 4.22.The study found that out of 192 HIV Positive adults on care, the highest disclosure was to husbands accounting to 71 (37.0%), followed by wives at 30 (15.6%), 20 (10.4) said they disclosed to children, 14 (7.3%) to other sexual partners. Those who had disclosed to either mother or father were 23 (13.0%), those who disclosed to brother, sister, aunt were 10 (5.0%), those who said they had disclosed to all family members were 9 (4.7), 5 (3.0%) disclosed to workmate, best friends and neighbors. The study also found that 10 (5.2%) had not disclosed their HIV status to any. The findings implies that there is a disparity in level of disclosure between couples especially as seen in the study that wives were ready to disclose to their husband at 37.0% while wives at 15.6%. In another finding, it was reported that people living with HIV under care were readily to disclose their HIV status to their nuclear family members (20.8%) than extended family members.

Table 4.21 Initial Viral Load after Initiation to Care

Disclosure	Frequency	Percent
Husband	71	37.0
Wife	30	15.6
Children	20	10.4
Father	9	4.7
Mother	12	6.3
Sister	6	3.1
Aunt	1	.5
Workmate	2	1.0
Best Friend	1	.5
Other Sexual Partner	14	7.3
Other Specify	2	1.0
none	10	5.2
All family members	9	4.7
Parents	2	1.0
Total	**192**	**100.0**

4.6.6.11 Adherence Failure of Adults HIV Positive Clients on Care

The study sought to find out the level of failure to adherence to HIV treatment. Adherence to HIV treatment is important in bringing down viral load. The finding are as shown in table 4.23.The study found that out of 192 HIV positive adult on care under study 107 (55.8%) either failed completely to adhere to HIV treatment or failed some of the time. However 85 (44.3%) said they have never failed to adhere to their HIV treatment. Therefore majority of the adults HIV positive on care reported to have failed in adherence to their treatment regime (55.8%).

Table 4.22 Adherence Failure of Adult HIV Positive Clients on Care

Adherence	Frequency	Percent
Never Fail	85	44.3
Some of the time	90	46.9
All the Time	17	8.9
Total	**192**	**100.0**

4.6.6.12 Adherence: Knowledge on Partner HIV Status by HIV Positive Adults Clients on Care

The study sought to find out whether the HIV positive clients on care under study knew their partners HIV status. This was important in HIV prevention (re-infection), HIV management and other support. The study found that out of 192 HIV adult clients on care 140 (72.9%) knew the HIV status of their Partners as either positive or negative, however 32 (16.7%) said they didn't know the HIV status of their sexual partners, while 20 (10.4%) reported to have no sexual partners. Therefore majority of HIV adult clients on care under study reported to have known their partners HIV status (72.9%), either positive or negative, however 16.7% of HIV adult clients on care under study reported to have no knowledge on HIV status of their sexual partners.The findings are as shown in Table 4.23

Table 4.23 Knowledge on Partner HIV Status by HIV Positive Adults Clients on Care

Knowledge of Status	Frequency	Percent
HIV +	100	52.1
HIV -	40	20.8
I don’t know his or her HIV status	32	16.7
No Partner	20	10.4
Total	**192**	**100.0**

4.6.6.13 Knowledge on Partner Failure to HAART Adherence by HIV Positive Adults Clients on Care

The study sought to find out whether the HIV Positive adults on care under study were aware on the Adherence status of their sexual partners to treatment. This was important in establishing whether the HIV positive clients on care knew whether their sexual partners were on treatment, adhere to treatment and other support which plays key roles in viral load suppression during management. The findings are in Table 4.25. The study found that out of 192 of HIV Positive adults on care under study, 57 (29.7%) said their partners fail to adhere to treatment either all the time or sometimes, 42 (21.9%) said that their sexual partners are not on treatment. The study similarly found that 40 (20.8%) said that they didn’t know whether their sexual partners adhere to treatment or not. However 39 (20.3%) said that their partners never fail to adhere to the treatment while 14 (7.3%) said they do not have active sexual partners. Therefore despite the fact that 29.7% of HIV positive adults clients on care under study reported of their sexual partners to have failed in treatment adherence, majority of clients reported of their sexual partners to be either

not on treatment or did not know whether their sexual partners were on treatment or not (42.7%).

Table 4.24. Partner Failure to HAART Adherence by HIV Positive Adults Clients on Care

Partner Failure	Frequency	Percent
All the time	32	16.7
Some of the time	25	13.0
Never Fail	39	20.3
Partner Not on Treatment	42	21.9
I don't know	40	20.8
No Partner	14	7.3
Total	**192**	**100.0**

4.6.2 Clients Health Related Correlates Associated with Viral Load Suppression

Bivariate analysis involved cross tabulation and use of chi-square based on clients health related factors included (adherence, comorbidity, psychological, substance, nutrition's, influence viral load in patients at Naivasha Sub-County. The Chi-Squared statistical analysis compares the tallies or counts of categorical responses between two (or more) independent groups. To interpret the Chi Square statistical test the convectional a p-value was used where if the p-value was less than 0.05 then it was deduced that the relationship between clients health related factors and viral load suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County was not by chance and so there was a significance association between the clients health correlates and the viral load suppression at 95% confidence interval. The results of analysis are as shown in the section below.

4.6.2.1BMI and Viral Load Suppression

The study found that there was no difference in proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood and clients with viral load less than 1,000 copies/microliter of blood based on BMI. The chi square results were χ^2= (3, N=192) =1.740, p=0.628). The study also found that P value was at 0.628 indicating that BMI of a HIV positive adult's clients understudy was not significant correlates of viral load suppression. The degrees of freedom was (4-1) (2-1) = 3, calculated as (r-1) (c-1), where r is the number of rows and c is the number of columns. The findings are as shown in Table 4.25.

Table 4.25. BMI and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
	Suppressed		Not Suppressed				
	F	%	F	%	1.740		
Underweight	12	9.6	8	11.9		3	0.628
Normal	79	63.2	46	68.7			
Overweight	26	20.8	9	13.4			
Obese	8	6.4	4	6.0			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.2.2 Duration for HIV Testing and Viral Load Suppression

The study found that the more proportion of adults HIV positive clients on care under study who were tested recently had lower viral load than those tested earlier. The proportion of viral load was also found to vary with the period tested. This implies that ART choice of regimen is important to suppress viral load from initial initiation rapidly

to achieve maximum outcome of viral suppression within a shorter time to avoid other complicated ART side effects due to longer use of ARVs. This also calls for highly sensitive and specific HIV test kits to detect early HIV infections and initiate them on HAART early enough to avoid HIV new infections and achieve maximum viral load suppression as well as taking care of getting co-infections. The chi square results χ^2 = (3, N=192) =16.34, p=0.003). The study found that p-value was at 0.003which showed that period tested was a significant correlates influencing viral load suppression. The degrees of freedom was (4-1) (2-1) = 3, (r-1) (c-1), where r is the number of rows and c is the number of columns. The findings are as shown in Table 4.26.

Table 4.26 Duration for HIV Testing and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Duration for HIV Testing	Suppressed		Non Suppressed				
	F	%	F	%	16.34		
Less than 3 months	7	5.6	3	4.5		3	0.003
3-6 months	2	1.6	9	13.4			
6-1 years	9	7.2	1	1.5			
> 1 year	107	85.6	54	80.6			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.2.3 Co-morbidities and Viral Load Suppression

The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood for clients who had co-existing illness which included TB (46.3%), Diabetes (10.4%) and Hypertension (9.0%) more than any other health conditions. The chi square results $\chi 2$ = (8, N=192) =14.4, P=0.031). P-value was at .031, which indicated that existence of some co-existing illness was related with

high HIV viral load and was therefore a significant correlates influencing viral load suppression. The degrees of freedom was is (9-1) (2-1) = 8, equal to (r-1)(c-1), where r is the number of rows and c is the number of columns. The findings are as shown in Table 4.27.

Table 4.27 Co-morbidities/Co-Infectionand HIV Viral Load Suppression

Variable	What is your current Viral Load Today?				Chi Square $\chi2$	DF	P-Value
Comorbidities/Co-Infections	Suppressed		Not Suppressed		14.4		
	F	%	F	%			
TB	78	62.4	31	46.3		8	0.031
Meningitis	8	6.4	2	3.0			
Diabetes	2	1.6	7	10.4			
Hypertension	6	4.8	6	9.0			
Traditional Medicine	1	0.8	1	1.5			
Cancer	4	3.2	2	3.0			
STI	2	1.6	1	1.5			
Others	2	1.6	4	6.0			
None	22	17.6	13	19.4			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.2.4 Substance Abuse and Viral Load Suppression

The study found that there was more proportion of adults HIV positive clients with more than 1000 viral copies/microliter of blood at 42.5.0% in clients taking substances and alcohol than those who were not taking substances and alcohol at 20.0%. The chi square results χ^2= (1, N=192) =2.20, P=0.094). The study also found that p-value was at .094

which was greater than 0.05. This showed that taking alcohol and substances was not related with viral load and was therefore a significant correlates influencing viral load suppression. The degrees of freedom was (2-1) (2-1) = 1 (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degree of freedom was 1.

Table 4.28Substance Abuse and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Substances and Alcohol Abuse Intake	Suppressed		Not Suppressed		2.20		
	F	%	F	%			
Yes	32	25.6	24	35.8		1	0.094
No	93	74.4	43	64.2			
Total	**125**		**67**			**n=192**	

4.6.2.5 Nutritional Perceptionand Viral Load Suppression

The study found that there was more proportion of adults HIV positive clients with more than 1000 viral load copies/microliter of blood that either was not sure if their nutrition intake status at home had impact on medicine adherence than those who either agreed or strongly agreed. %. The chi-square results were χ^2 = (1, N = 192) = 20.325, p = 0.001).

The p-value was at 0.001, which indicated that nutrition's was related with HIV viral load suppression. The degrees of freedom is (2-1) (2-1) = 1, (r-1) (c-1), where r is the number of rows and c is the number of columns. The findings are as shown in Table 4.29.

Table 4.29 Nutritional Perception and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P-Value
Nutrition	Suppressed		Not Suppressed				
	F	%	F	%	20.325		
Disagree	16	12.8	11	16.4		4	0.001
Strongly Disagree	7	5.6	14	20.9			
Undecided	45	36.0	14	20.9			
Agree	25	20.0	20	29.9			
Strongly Agree	32	25.6	8	11.9			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.2.6 Number of Sexual Partners for the last 6 months and Viral Load Suppression

The study found that there was more proportion of adults HIV positive clients on care with more than 1000 viral copies in HIV positive adults with more than sexual partners than those with one partners or no partner. The chi square results were χ^2= (4, N=192) =12.138, P=0.032).

The study found that p-value was at 0.032which indicated that number of sexual partner was significant correlate of viral load suppression. The degrees of freedom is equal 2-1) (2-1) = 1, where r is the number of rows and c is the number of columns. The findings are as shown in Table 4.30.

Table 4. 30: Number of Sexual Partners and Viral Load Suppression

Variable	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Number of Sexual Partners	Suppressed		Not Suppressed				
	F	%	F	%			
1 Partners	97	77.6	43	64.2	12.138	4	0.032
2-3 Partners	11	8.8	10	14.9			
3-4 Partners	0	0.0	4	6.0			
More than 4 Partners	8	6.4	6	9.0			
No partners	9	7.2	4	6.0			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.2.7 Frequency of Having Sex without Using Protection (Condoms)and Viral Load Suppression

The study found that there were no difference in proportion of adults HIV positive clients with more than 1000 viral copies/microliter of blood for clients who use condoms either sometimes or never and clients with less than 1000 viral load/ microliter of blood was associated with HIV adults clients who never miss to use condom. The chi square results were χ^2= (4, N=192) =2.817, P=0.421). The study found that p-value was at 0.421 which shows that there was no significant association between condom use and viral load suppression. The degree of freedom was (2-1) (2-1) = 1.The findings are as shown in Table 4.31.

Table 4.31 Frequency of Condom Use and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P -Value
Frequency of Condom	Suppressed		Not Suppressed				
	F	%	F	%	2.817	3	
All the time	31	24.8	43	64.2			0.421
Some of the time	34	27.2	10	14.9			
Never Miss	56	44.8	4	6.0			
No Partner	4	3.2	6	9.0			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.2.8 Frequency of STI Infection and Viral Load Suppression

The study found that there was no more proportion of adults HIV positive clients on care with more than 1000 viral copies in HIV positive adults for clients who had exposure of STI than those with no previous exposure of STI. The chi square results were χ^2= (4, N=192) =3.26, p=0.110). The study found that p-value was at 0.110 which indicated that exposure of STI was not significant correlate of viral load suppression. The degrees of freedom is equal 2-1) (2-1) = 1, where r is the number of rows and c is the number of columns.

The study found that p-value was at .110 which more than .05 which indicated that existence of exposure to STI was not related with viral load and was therefore was not significant correlates influencing viral load suppression . The degree of freedom was 4, equal to(r-1) (c-1). The findings are as shown in Table 4.32.

Table 4.32 Frequency of STI Infection and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P-Value
Frequency of STI Infection	Suppressed		Not Suppressed				
	F	%	F	%	3.26		
1-2 weeks	43	34.4	18	26.9		4	0.110
3-6 weeks	7	5.6	13	19.4			
2-4 weeks	17	13.6	10	14.9			
None	55	44.0	21	31.3			
Other Specify	3	2.4	5	7.5			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.2.9 Psychological /Disclosures and Viral Load Suppression

The study found out that there were no difference in proportion of adults HIV positive clients with more than 1000 viral copies/microliter of blood to those who disclosed to extended family than those who disclosed to nuclear family and reduces towards disclose to children. The chi-squared results were χ^2= (14, N=192) =4.40, P=0.337). This showed that p value 0.337 which was more than .05 which indicated that disclosure was not related with viral load and was therefore a significant correlates influencing viral load suppression. The degrees of freedom was equal to (2-1) (2-1) = 1, (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degree of freedom. The findings are as shown in Table 4.33.

Table 4.33 Psychological / Disclosure and Viral Load Suppression Variable

Disclosure	Suppressed	Not Suppressed	Chi Square χ^2	DF	P-Value
Husband	55 44.0%	16 23.9%	4.40	14	0.337
Wife	16 12.8%	14 20.9%			
Children	6 4.8%	14 20.9%			
Father	6 4.8%	3 4.5%			
Mother	8 6.4%	4 6.0%			
Sister	5 4.0%	1 1.5%			
Brother	2 1.6%	1 1.5%			
Aunt	0 0.0%	1 1.5%			
Workmate	2 1.6%	0 0.0%			
Best Friend	0 0.0%	1 1.5%			
Other Sexual Partner	10 8.0%	4 6.0%			
Other Specify	2 1.6%	0 0.0%			
none	6 4.8%	4 6.0%			
All family members	6 4.8%	3 4.5%			
Parents	1 0.8%	1 1.5%			
Total	**125**	**67**			n=192

4.6.2.10 Frequency of Failure to Adherence of HIV Treatment and Viral Load Suppression

The study found out that there was more proportion of adults HIV positive clients with more than 1000 viral copies/microliter of blood with no consistency in adherence to treatment than those who adhered to treatment. The chi square results were $\chi2$= (2, N=192) =20.20, P=0.00). The study found that p-value was at .00 which indicated that adherence was a significant correlates of viral load suppression. The degrees of freedom was (2-1) (2-1) = 1. The findings are as shown in Table 4.34.

Table 4.34 Frequency of Failure to Adherence of HIV Treatment and Viral Load Suppression

Variable	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Adherence	Suppressed		Not Suppressed				
	F	%	F	%	20.20		
Never Fail	70	56.0	15	22.4		2	0.00
Some of the time	48	38.4	42	62.7			
All of the time	7	5.6	10	14.9			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.2.11Knowledge of Partner Status and Viral Load Suppression

The study found that there was no difference in proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood and those with less than 1000 viral load based on knowing status of partner. The chi-squared results were χ^2= (2, N=192) =6.79, p=0.538). The study found that p-value was at 0.538. This showed that p

value was more than .05 which indicated that Knowledge of partner's status is not enough to influence HIVCorrelates of Viral Load suppression. This agrees with previous findings that wife to husband disclosure was not successful and was in most cases associated with rampant divorce cases. The findings are as shown in Table 4.35.

Table 4.35 Knowledge of Partner Status and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P-Value
Knowledge of Partners HIV Status	Suppressed		Not Suppressed				
	F	%	F	%	6.79	2	0.538
Yes	96	76.8	47	70.1			
No	20	16.0	15	22.4			
No Partners	9	7.2	5	7.5			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.2.12 Partners Failure of ARVs Adherence and Viral Load Suppression

The study found out that there was more proportion of adults HIV positive clients with more than 1000 viral copies/microliter of blood who said that their partners consistently fail to adhere to ARV treatment than those who said their partners adhere to ARV medicines. The chi square results were χ^2= (5, n=192) =13.74, P=0.030). The study found that p-value was at 0.030. This showed that p value was less than .05 which indicated that existence of some nutrition's was related with viral load and was therefore a significant correlates of viral load suppression. The degree of freedom is equal to (r-1) (c-1), where r

is the number of rows and c is the number of columns. For this example, the degrees of freedom is (2-1) (2-1) = 1. The findings are as shown in Table 4.36.

Table 4.36: Partners Frequency to ARVs Adherence and Viral Load Suppression

Variable	What is your current Viral Load Today?				Chi Square χ^2	DF	P-Value
Partners frequency to ARVs Adherence	Suppressed		Not Suppressed				
	F	%	F	%			
All the Time	18	14.4	14	20.9	13.74	5	0.030
Some of the Time	10	8.0	15	22.4			
Never Fail	28	22.4	11	16.4			
Partners not on treatment	33	26.4	9	13.4			
I don't know	26	20.8	14	20.9			
No Partner	10	8.0	4	6.0			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.6.3 Client Health Related Factors Associated with Viral Load Suppression

Multivariate analysis was employed to assess the client's related factors correlates of viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County. Multiple logistic regression model sought to reveal whether clients health related factors includes (adherence, comorbidity, psychological , substance, nutrition's , influence viral load in patients at Naivasha Sub-County were significant correlates of viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County.

The research utilised logistic regression in form of odd ratio (OR), which is used to measure the association between chance of exposure and the outcome. The Odd ratio is counted by comparing the likelihood of something occurring as compared to the odds of something not occurring. In this case the research is comparing the relative odds of viral load suppression occurring or not occurring based on adults. Clients health related factors includes (adherence, comorbidity, psychological, substance, nutrition's, influence viral load in patients at Naivasha Sub-County.

The aim is to establish whether clients health related factors can influence magnitude or risk of viral load suppression. The validity of odd ratio is measured using a threshold of 95% confidence interval (CI) which is used to estimate the precision of the OR. A large CI is regarded as a measure of a low precision of the OR, where as a small CI indicates a higher precision of OR.

Table 4.37: Logistic regression analysis of clients health and viral suppression among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County

Predictors		Odd Ratio	Lower Limit	Upper Limit	P-Value
	Underweight	12.278	0.170	34.20	0.028
BMI categories	Normal	16.683	0.111	27.00	
	Overweight	7.876	0.226	18.90	
	TB	8.020	0.070	14.511	
	Meningitis	14.662	0.155	26.111	
	Diabetes	20.438	0.413	33.502	
Comorbidities/Co-infection	Hypertension	23.332	0.166	45.900	0.041
	Traditional Medication	6.732	0.111	12.771	
	Cancer	15.028	0.226	35.000	
	STI	11.797	0.309	24.010	
Substances and Alcohol Abuse Intake	Yes	12.841	0.230	65.001	0.094
	Disagree	0.117	0.159	3.637	
Nutrition	Strongly Disagree	0.532	0.011	6.801	0.001
	Undecided	9.858	0.210	25.666	
	Agree	5.889	0.49	18.912	
	All the time	18.811		36.367	0.021
Sex without Condom	Some of the time	.881	0.160	3.777	
	Never Miss	16.887	0.106	55.220	
	Partner	-20.462	0.003	37.619	
Number of Sexual Partners	2-3 Partners	-2.180	0.026	15.821	0.032
	3-4 Partners	21.264	0.113	64.395	
	More than 4	-51.488	1.248	219.56	
	1-2 weeks	76.989	14.005	146.890	
Frequency of STI	3-6 weeks	18.172	0.023	37.230	0.010
	2-4 weeks	57.774	12.901	99.980	
	Wife	29.786	0.812	56.551	
	Children	10.469	0.268	34.500	
Disclosure	Father	110.109	0.104	167.338	
	Best Friend	39.308	0.288	73.087	0.037
	Other Sexual Partner	87.727	.830	117.971	
Knowing Partner HIV status	Yes	105.302	1.358	145.800	
	No	95.887	12.812	148.110	0.538
	Never Fail	15.141	0.704	46.671	
Adherence	Some of the time	22.970	0.189	59.959	0.000
	All the Time	32.001	1.365	45.679	

n=192

The findings indicates that adults HIV positive clients with normal BMI were 16.683 times likely to have less than 1000 copies/ Microliter of blood (OR 12.278) while those with underweight BMI were 12.278 likely to have more than 1000 copies/ Microliter of blood (OR 16.683). Therefore BMI of adult HIV positive clients under care had high odd of influencing viral load suppression.

The study also found that adults HIV positive clients who were diagnosed in their prior initial visit with the health worker to start HIV care and found Diabetes as co-existing illness were 20.438 likely to have more than 1000 copies/ Microliter of blood, followed by odds of Meningitis (14.662) hypertension (23.332) and TB (8.020). This implies the odd of HIV positive clients under study of having more than 1000 viral load copies / microliter of blood was high in clients with non-communicable co-existing illness e.g. diabetes than communicable illness such as TB.

The study found that the adults HIV positive clients who consume alcohol and substances were 12.841 likely to likely to have more than 1000 copies/ microliter of blood than those with low viral load, It was also found that the odd was of tobacco intake was (OR= 14.740), followed by alcohol intake (11.867), Miraa intake (10.393), IDU (7.987) and Marijuana (7.023). This implies that all forms of substances and alcohol intake during HIV treatment should be discouraged.

Concerning perception of adults HIV positive on care in the study area whether their nutritional intake at home was helping to support the drugs adherence, the study found that there were higher odds of (OR=9.8) for having have more than 1000 copies/ microliter of blood for those who were not sure of their nutritional intake, followed by

those who strongly disagreed that their nutritional intake was reasonable (OR=9.8). The findings indicates that adults HIV positive clients who reported to have not missed having sex without using condom were 16.887 times likely to have less than 1000 copies/ Microliter of blood (OR 16, 95% C.I = 0.88-2.35) while those who never use were 18.811 likely to have more than 1000 copies/ Microliter of blood (OR 18.11, 95% C.I = 0.88-2.35). Therefore condom use of HIV adult's clients under care had high odds of influencing viral load suppression.

The findings indicates that adults HIV positive clients who reported to have one partner were 20.462 times likely to have less than 1000 copies/ Microliter of blood (OR 20.462% C.I = 0.88-2.35) while those with more than 1 partners were likely to have more than 1000 copies/ Microliter of blood (OR 51.888, 95% C.I = 0.88-2.35). Therefore number of sexual partners of HIV adult's clients on care under study had high odds of influencing viral load suppression.

The findings indicates that adults HIV positive clients who reported to have got STI from an infected HIV Partner and treated recently within 1-2 weeks or 2-4 weeks were likely to have more than 1000 copies/Microliter of blood (OR 76. 989% C.I = 0.88-2.35) while those with no incidence of having been exposed to STI were likely to have less than 1000 copies/Microliter of blood (OR 73.332, 95% C.I = 0.88-2.35). Therefore sexual lifestyle during care for adult HIV clients under study had high odds of influencing viral load suppression.

The study found adults HIV positive clients who reported to have disclosed their HIV status to nuclear family members were likely to have less than 1000 copies/ Microliter

of blood (OR 57.972% C.I = 0.88-2.35) while those who had disclosed to extended family members were found to have higher odd to have more than 1000 copies/ Microliter of blood (OR 116.8, 95% C.I = 0.88-2.35). This implies that the high odds of success of viral suppression were related with family relationships.

The study found adults HIV positive clients who reported to consistently adhere to treatment were likely to have less than 1000 copies/Microliter of blood (OR 32.001%) while those who had indicated they fail consistently in treatment adherence were found to have higher odd of having more than 1000 copies/Microliter of blood (OR 22.970%). This implies that the high odds of success of viral suppression were related with adherence to treatment.

The study found that there were higher odds of HIV adults clients with more than 1000 copies/Microliter of blood (OR 15.735) for clients who reported not to have been aware of their partner HIV status than those who knew status of their sexual partners, This implies that knowledge on partners HIV status was an important predictor of viral load suppression, at the same time the study found that knowledge on partners adherence to treatment was likely to influence higher odds of clients having less than 1000 viral copies/microliter of blood (30.775) than the one who did not know whether the partner were adherence to treatment consistently (8.8872) and partner not treatment (83.937) who were found to more than 1000 copies/Microliter of blood .

4.7 Health System Correlates Associated with Viral Load Suppression

The section contains the analysis of third objective of the study which was to determine the health system Correlates associated with viral load suppression among HIV Positive

Adults on Care in Naivasha Sub-County Hospital, Nakuru County. They included; staffing, infrastructures, structures, commodities, leadership and guidelines. This was done by univariate or descriptive data analysis which included frequency and percentage, Bivariate analysis using cross tabulation and chi-square and multivariate analysis where odd ratio analysis was used. This was done in order to draw conclusion whether there was an association between health systems correlates Among HIV Positive Adults. The descriptive, cross tabulation and chi-square as well as odd ratios are in section

4.7.1 Health System Correlates Among HIV Positive Adults on care in Naivasha Sub-County Hospital, Nakuru County

Univariate analysis is the simplest form of data analysis where the data being analysed contains only one variable. The purpose was to find categories that the data falls into the main purpose of univariate analysis is to describe the data and find patterns that exist within it. To describe the pattern found in univariate data involved use of frequency distribution tables and charts.

4.7.1.1 HIV Identifications and Retention

The study sought to find out whether the facility had capacity to provide comprehensive HIV services such as identification, ART initiation, linkages to care and retention. It also helped to assess the quality of HIV care e.g. counselling and testing. This was also meant to establish whether the facility had capacity for identification and retention of their clients. The facility in which client was tested can be either be the facility they will take drugs. The findings is in Table 4.45.The study found that out of 192 of adults HIV positive clients on care under the study 121 (63.0%) were tested for HIV in Naivasha Level 5 facility, of which of 50 (26.0%) said were taking were tested in other public

hospitals.. A cross-section of respondents accounting to15 (7.8%) were tested in other private facility, the least 3.1% (6) of the respondents were tested in community based facilities. The findings are as shown in Table 4.38.

Table 4.38: HIV Testing Site

	Frequency	Percent
Another Public Facility	50	26.0
Community	6	3.1
Another Private Facility	15	7.8
This Facility	121	63.0
Total	**192**	**100.0**

Analysis from KII was summarized as follows; on the issue concerning number of retention clients in the facility key informants stated the following “*We expected to have 3569 clients on active treatment, however currently we have only 2981 clients on care after 1 year, according to our records”.*

4.7.1.2 Initial Viral Load Testing Period

The study sought to establish the period at which the HIV Positive clients on care had their first viral load testing. This was meant to check if initial Viral Load testing was done as per guideline. According to guideline if viral load is detectable at 6 month the guidelines recommend for additional assessment. Patients with confirmed viral suppression can be followed up every 1-3 months based on patient’s preference and clinical judgement with additional unscheduled visits. For all after any regimen change (including single drug substitutions), perform VL at months 3 after regimen modification,

and then as per population group. For any patient with a detectable VL during routine monitoring, follow viral load monitoring algorithm. The findings are as shown in Table 4.39. The study found that out of 192 of clients most 96 (50.0%) indicated that their initial viral load testing period was 3 months, 30.2% (58) indicated their initial viral load testing period was 6months, 17.7% indicated a period of 1 years while 2.0% were not tested for viral load. The findings were as shown in Table 4.39.

Table 4.39 Initial Viral Load Testing Period

Testing Period	Frequency	Percent
3 months ago	96	50.0
6 months ago	58	30.2
1 year ago	34	17.7
not tested	3	1.6
others specify	1	.5
Total	**192**	**100.0**

4.7.1.3 Turnaround Time for Viral Load Testing

The study sought to find out the turnaround time for viral load test in the facility, this was meant to assess efficiency in viral load testing for patient's management to ensure retention in care. The study found that the turnaround time for viral load testing period was 2 months for most of clients as accounted for by 57.3% (110), followed by 63 (32.8% whose turnaround time was a month while 7.8% indicated 3 or 4 months. This implies there is inefficiency in receiving viral load test results in the facility which

implies high chance of poor HIV care and defaulters. The findings are as shown in Table 4.40

Table 4.40 Turnaround Time for Viral Load Testing

	Frequency	Percent
1 Months	63	32.8
2Months	110	57.3
3.Months	15	7.8
4.Months	4	2.2
Total	**192**	**100.0**

4.7.1.4 Current HIV Testing Period

The study sought to establish the period at which the HIV Positive clients on care had their first viral load testing. This was meant to check if initial Viral Load testing was done as per guidelines. The study found that out of 192 respondents most accounting to 41.1% as well as 40.1% said that their viral load testing period and 3 months and 6 months respectively after their previous viral load testing, while 17.1% said the duration was 1 year. This implies that most clients had come for their 3-6 viral load testing period after their initial test. The findings are as shown in Table 4.41

Table 4.41 Current HIV Testing Period

	Frequency	Percent
3 Months	79	41.1
6 Months	77	40.1
1 Year	34	17.7
Other Specify	2	1.0
Total	**192**	**100.0**

4.7.1.5 Tested for Viral Load Today

The study sought to find out whether clients had accessibility to viral load test at that particular time of study in line with their viral load testing period or if they were eligible or not for viral load testing. The study found that majority 101 (52.6%) were not tested for viral load during the day this assessment was carried out while 91 (47.4%) had their sample of viral load taken for test. The study further found that the main reason why clients were not tested for viral load that day was because their due date had not reached, while a big proportion of clients said that the facility was not able to test because of either faulty machine, lack of available machine or personnel to undertake viral load testing. The findings are as shown in Table 4.42

Table 4.42 Tested for Viral Load Today

	Frequency	Percent
Yes	91	47.4
No	101	52.6
Total	**192**	**100.0**

4.7.1.6 Category of Visit

The study sought to find out about category of visit by clients whether it was a scheduled visit or unscheduled visit to the facility. This was meant to find out whether patients come for their visit as per doctor’s advice or if there are patient who go to HIV care due to emerging personal health issues. E.g. Viral suppression failure, adverse drug reaction or health conditions. The study found that most of adult HIV clients in Naivasha Level 5 on the day of survey had attended the scheduled clinic as required by the appointment guidelines as accounted for by 157 (81.8%) of clients while 18.2% (35) of clients came

for unscheduled visit citing several reasons that the run out of stock of medicine, other suggested work related issues, other had called their health provider requesting scheduled for personal reasons, other cited health emergency which include side effects of medicine, need to discuss with their doctor on emerging health condition so were forced to re-schedule the medic for health reasons. The findings are as shown in Table 4.43

Table 4.43 Category of Visit

	Frequency	Percent
Scheduled	157	81.8
Unscheduled	35	18.2
Total	**192**	**100.0**

4.7.1.7 Turn-Around Time for HAART

The study sought to find out whether hospital was following the guidelines on initiation of HAART. The guidelines stipulate immediate same day or rapid ART initiation as soon as patient is ready or within 2 weeks period. The Study found that out of 192 of clients majority of adults with HIV clients attending study area accounting to 156 (81.3%), indicated that HAART started immediately, followed by 12(6.3%) who indicated that that HAART took a period of 2-4 weeks or more. The findings are as shown in Table 4.44

Table 4.44: Turn-Around Time for HAART

	Frequency	Percent
1 Day to one week	156	81.3
2 weeks to 4 weeks	12	6.3
1 months to 2 months	8	4.2
Above 4 Months	12	6.3
No counseling	4	2.1
Total	**192**	**100.0**

4.7.1.8 Duration for Counselling Sessions on HAART

The study sought to find out the duration of counseling sessions provided by the health care for treatment care preparation, acceptance and adherence. Counseling is considered important as psycho-social element of support given to patient living with HIV Virus. The study found that most of adults living with HIV virus in the study area were counseled for less than 30 minutes accounted for by 60.4%, followed by clients who said they were counseled for a duration of 30 min-1 hour at 30.9% and minority were counseled for 1-2 hours as accounted for by 4.7% of the respondents. Guidelines say that counseling should be continuous or as per patients' needs and for this case the counseling was inadequate.The findings are as shown in Table 4.45.

Table 4.45 Duration for Counselling Sessions on HAART

Duration of Counseling session	Frequency	Percent
Less than 30 minutes	116	60.4
30-1 Hour	67	34.9
1 Hour-2 Hours	9	4.7
Total	**192**	**100.0**

4.7.1.9 Clients Discussion with Doctor during the Visit

The study sought to establish what health care worker discussed prioritized to discuss with the client as per the client's needs. The findings are as shown in Table 4.55.The study established the most of the adults living with HIV had gone to pick their usual medicine as accounted for by 52.2% (100) of clients, followed by 40 (20.8%) who discussed with their doctor about adherence, 20 (10.4%) indicated their issues has to do with nutrition, 5.7% (11) said their issue was side effects of medicine, 4.6% (9) said they

discussed about family planning while 5.2% (10) said they discussed on viral suppressions.The findings are as shown in Table 4.46.

Table 4.46: Discussions with a Doctor during the Visit

Issues Discussed	Frequency	Percent
Came to pick Medicine	100	52.2
Adherence	40	20.8
Nutrition	20	10.4
Side Effects	11	5.7
Family Planning	9	4.6
Viral Load Suppressions	10	5.2
Total	**192**	**100**

4.7.1.10 Rating the Discussion and Examination in the initial Visit

The study sought to establish how HIV positive adults on care perceived the competence of Health service provider during the initial visit to HIV care in the facility. The guidelines require the health care workers to completely provide information and examine HIV positive clients on below underlining health issues from the clients. The study found that most adults clients living with on care under the study perceived health service providers to be competent in examining and diagnosing, TB, meningitis, hypertension, diabetes, kidney (80.2%), also liver diseases as indicated by 80.2% of respondents, others were as follows; Current Medication/Concoction, Drug Allergies, ARV Exposure History, Hospitalization History, Family History, Chronic Disease/ Cancer and STI. The findings are as shown in Table 4.47.

Table 4.47 Rating Competence of Health Workers

	Strongly Agree		Agree		Strongly Disagree		Disagree	
	F	%	F	%	F	%	F	%
TB, Meningitis, Hypertension, Diabetes	154	80.2	19	9.9	6	3.1	13	6.8
Kidney, Liver Diseases	157	81.8	22	11.5	7	3.6	6	3.1
Current Medication/ Concoction	156	81.3	24	12.5	6	3.1	6	3.1
Drug Allergies	145	75.5	26	13.5	8	4.2	13	6.2
ARV Exposure History	134	69.8	30	15.6	9	4.7	19	9.9
Hospitalization History	128	66.7	30	15.6	11	5.7	23	12.0
Family History	129	67.2	27	14.1	12	6.3	24	12.5
Chronic Disease/ Cancer	126	65.6	28	14.6	13	6.8	25	13.0
STI	125	65.1	28	14.6	13	6.8	25	13.0
					n=192			

4.7.1.11 Rating Overall Understanding of Provider during Initial Visit

The study sought to establish whether the patients understood their health provider in their first initial visit to care on the underlining health related issues when they were examined. This will ensure their consistency in care. The guidelines stipulate that health care provider must ensure HIV positive clients before care and on care must understand the underlining health related issues for better patients management.The study found that most of HIV positive clients understood about sexual transmitted infections and symptoms as accounted for by 59.4%, followed by 58.9% management of HIV disclosure, 57.8% indicated family planning and pregnancy planning, 52.6% indicated

Prevention of other infections e.g. Malaria, Safe water, immunization, mental illness and lastly cervical cancer screening. The findings were as shown in Table 4.48.

Table 4.48: Rating Overall Understanding of Provider during Initial Visit

	Very Well		Well		Very Difficult		Difficult	
	F	%	F	%	F	%	F	%
Sexual transmitted infections and symptoms	114	59.4	34	17.7	15	7.8	29	15.1
The need to disclose your HIV status to your Sexual Partners	113	58.9	29	15.1	17	8.9	33	17.2
Family planning and pregnancy planning	111	57.8	35	18.2	13	6.8	33	17.2
Cervical Cancer Screening	102	53.1	32	16.7	17	8.9	41	21.4
Prevention of other infections e.g. Malaria, Safe water, immunization, mental illness	101	52.6	32	16.7	20	10.4	39	20.3
n=192								

4.7.1.12 Linkages to Cares

The study sought to establish on whether HIV Clients were linked to any support services during their continuum of care at the time of study. Guidelines requires HIV positive clients on care to be linked to other support services that will promote adherence to treatment.The study found that most of adults HIV clients were not linked to any support group or services as accounted for by 38.0% , followed by 33.9% of clients who said they were linked to support group, 19.8% indicated said they had joined community based support group, 5.7% indicated they were linked to gender based services while 2.6% said paralegal group.The findings were as shown in Table 4.49.

Table 4.49 Linkages to Cares

Linkages to Cares	Frequency	Percent
Community	38	19.8
Gender Based Services	11	5.7
Paralegal Services	5	2.6
Support Group	65	33.9
None	73	38.0
Total	**192**	**100.0**

The following are qualitative statements from Key in formants regarding linkages and viral load suppression.

Regarding the issues of community support the Keyinformants stated the following "*need for CHVs allocation to help in defaulters and lost to follow-up tracing",*

Another key informant said the follow; "it *is important to involve CHVs fully because they understand all the needs of the community"*

Also another key informant stated the following ;" *CHWs are important because they are effective in mapping HIV Clients, they also help in decentralization of ART services to help in refill, group support, reduction of stigma and community testing"*

On service delivery and linkages the key informants stated that " *Timely linkages in HIV care services and wards is needed in this facility",* Another key informant stated the following " "*Some patients get lost within the hospital service delivery points before reaching C.C.C especially after HIV Testing* ".

Key informants also stated that "though *the health workers are skilled there are challenges in follow up of patients".*

4.7.1.13 Tests Undertaken to Clients in the Facilities

The study sought to establish whether clients had been tested for conditions such as TB, C Meningitis, Diabetes, and Hypertension, CD4 Count, liver function test, cancer treatment, syphilis and STI. This was meant to ascertain if the facility have necessary commodities to test for various health conditions that could exist in the HIV positive adults on care at the time of study of which it was also to assess the general positive clinical care management as prescribed by the guidelines. The established that most clients were tested for TB during their HIV care, the study also found that there was low testing rate for tested for C Meningitis (28.1%), Diabetes (23.1%), Hypertension (34.1%), CD4 Count (30.7%), liver function test (26.0%), cancer treatment (27.1%) and syphilis and STI at (28.1%). This implies that the health facility had low capacity to test for most of the tests. The findings are as shown in Table 4.50

Table 4.50: Tests

	Yes		No	
	F	%	F	%
TB	161	83.9	31	16.1
C Meningitis	54	28.1	138	71.9
Diabetes	45	23.4	147	76.6
Hypertension	67	34.9	125	65.1
CD 4	59	30.7	133	69.3
Liver function	50	26.0	142	74.0
Cancer	52	27.1	140	72.9
Syphilis and STI	54	28.1	138	71.9
			n=192	

4.7.1.14 CD4 Count

The study sought to find out whether health systems of hospital in Naivasha general hospital are able to assess CD4 Count.The data provided from the HIV health information system from individual adult HIV clients established that 176 (91.7%) % of adult living with HIV virus and on care during the study had no CD4 Count report. The study also revealed that 5 out of 16 with available CD 4 Count data had CD4 Count of less than 200 while 11 out of 16 had CD4 Count of more than 200. The guidelines stipulates that HIV Positive clients with CD4 <= 200, must be screened for Cryptococcus Meningitis. However, the from HIV health information system for individual clients differed from summary provided from Facility laboratory data which is linked to NASCOP. This may be was caused by documentation issue since they have no data for 2018.The findings are as shown in Table 4.51.

Table 4.51 CD4 Count

CD4 Count Levels	Frequency	Percent
Less than 200 CD4 count	5	2.6
More than 200 CD4 count	11	5.7
Total	16	8.3
No data	176	91.7
Total	**192**	**100.0**

4.7.1.15 ART Treatment Regimen Type

The study sought to find out the type of ART treatment regimen that is administered to Adult living with HIV clients in the study area at the time of the study. According to guidelines first line treatment regimen is recommended for patients who are starting ART for the first line however in case of HIV viral load suppression failure and other factors

the treatment regime can change. The study found that majority of adult HIV clients in the study area accounting to 80.2% are in first line treatment regime while only 19.8% are in second line ART treatment regimen. The findings are as shown in Table 4.52

Table 4.52. ART Treatment Regimen Type

	Frequency	Percent
First Line	154	80.2
Second Line	38	19.8
Total	**192**	**100.0**

4.7.1.16 ART Drug Name

The study sought to find out the frequency of ART drugs that are prescribed to HIV Positive adults clients on care in the study area during the time of study.The study found that most frequently prescribed medicines were TDF/3TC/EFV which is first line which was accounted for by 44.8% of clients, followed by TDF/3TC/NVP also first line as accounted for by 17.2% of clients and third was TDF/3TC/DTG (First or second ARV regimen) and AZT/3TC/ATV (Second line) as accounted for by 13.5% % and 13.0% respectively.The findings are as shown in Table 4.53.

Table 4.53ART Drug Name

ART Drug name	Frequency	Percent	ART Regimen
AZT/3TC/EFV	3	1.6	1
AZT/3 TC /ATV	1	.5	2
AZT/3 TC /LPV	1	.5	2
AZT/3TC/ATV	25	13.0	2
AZT/3TC/LDV	1	.5	2
AZT/3TC/NVP	2	1.0	1
TDF/3TC/ATV	11	5.7	1
TDF/3TC/ATV$_R$	1	.5	1
TDF/3TC/DTG	26	13.5	1 or 2
TDF/3TC/EFV	86	44.8	1
TDF/3TC/NVD	2	1.0	1
TDF/3TC/NVP	33	17.2	1
Total	**192**	**100.0**	

4.7.1.17 Overall Satisfaction According to HIV Adults Clients

The study sought to assess how satisfied HIV adult’s clients were satisfied with HIV care services offered by the general facility.The study established that most of adult HIV clients were satisfied with staff respect (74.5%), staff courtesy (75.5%) and staff dignity (72.4%), treatment (64.6%) and counseling (63.5%) however they were dissatisfied with either working hours 42.7% and clinic schedule (63.5%).The findings are as shown in Table 4.54.

Table 4.54: Overall Satisfaction

	Very Satisfied		Somewhat Satisfied		Somewhat Dissatisfied		Very Dissatisfied	
	F	%	F	%	F	%	F	%
Staff Respect	143	74.5	12	6.3	10	5.2	27	14.1
Staff Courtesy	145	75.5	11	5.7	11	5.7	25	13.0
Staff Dignity	139	72.4	11	5.7	10	5.2	32	16.7
Working Hours	82	42.7	11	5.7	30	15.6	69	35.9
Clinic Schedule	84	43.8	9	4.7	31	16.1	68	35.4
Treatment	124	64.6	9	4.7	14	7.3	45	23.4
Counselling	122	63.5	5	2.6	16	8.3	49	25.5
n=192								

4.7.2 Health System Related Correlates Associated With Viral Load Suppression

Bivariate analysis involved cross tabulation and use of chi-squared based to evaluate whether health system correlates is associated with viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County. Health systems consist of structures and processes whose primary objective is to promote, restore and maintain health. Health systems factors include status of health care facilities, commodities, health care legislation, standards, policies, and regulations, resources (which includes fiscal, human facilities and sites as well as education of health workers).

4.7.2.1 Patients Management and Viral Load Suppression

The study sought to find out about category of visit by clients whether it was a scheduled visit or unscheduled visit to the facility and whether it correlates with viral load

suppression. This was meant to find out whether patients come for their visit as per doctor's advice or if there are patient who go to HIV care due to emerging personal health issues. E.g. Viral suppression failure, adverse drug reaction or health conditions. The study established significant association of adults HIV Positive clients that had more than 1000 viral load copies /millilitre of blood and exhibiting irregular visit to the health facility under study during the study period. Also the study found that HIV positive clients with less than 1000 viral load copies/microliter of blood had regular / scheduled visits. The chi square results were χ^2= (5, N=192) =12.24, p=0.048). The study also found that p-value was at 0.048. This showed that p value was less than .05 which indicated that patient management was a significant correlates influencing viral load suppression. The degrees of freedom was (2-1) (2-1) = 1, where r is the number of rows and c is the number of columns. The findings are as shown in Table 4.55.

Table 4.55 Patient Management and Viral Load Suppression

Variable							
					Chi Square χ^2	DF	P Value
Patients Management	Suppressed		Not Suppressed		12.24	1	0.048
	F	%	F	%			
Scheduled Visits	107	85.6	50	74.6			
Unscheduled Visits	18	14.4	17	25.4			
Total	**125**	**100**	**67**	**100**		**n=192**	

The following are qualitative statements from Key in formants regarding patient's management and viral load suppression. The following were stated by the key informants.

On the issue concerning number of retention clients in the facility key informants stated the following "*We expected to have 3569 clients on active treatment, however currently we have only 2981 clients on care after 1 year, according to our records"*

Another Key informants said the following concerning challenges of retention; "*We often experienced challenges in retention of clients on care*".

Another key informant stated that "The *current retention rate is at 83.5%, which is below the recommended 90.0% retention rate by United Nation.*

Concerning the reasons for retention challenges at the facility key informants said the following "*The likely cause of retention is distance to facility, lack of HIV information from health workers during initial visit, issues of turnaround time and HAART linkages".*

4.7.2.2 Guidelines and Viral Load Suppression

The study sought to find out whether the turnaround time for viral load test in the facility, influenced viral load suppression. The guidelines stipulates for timely testing and use of viral load results for patient management as required. The study established that there was no significant association of adults HIV Positive clients who had more than 1000 viral load copies /millilitre of blood with their longer turnaround time of receiving their HIV Viral load test results. The chi square results were χ^2= (4, N=192) =3.43, p=0.225). Also the study found that there was a no significant association of adult HIV positive clients who had less than 1000 viral load copies/millilitre of blood and their shorter turnaround time of getting HIV Viral load test results. Study also showed that p-value

was more than .05 which indicated that turnaround time was not significant correlates influencing viral load suppression. The findings are as shown in Table 4.56.

Table 4.56: Guidelines Use and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Viral Load Turn Around time	Suppressed		Not Suppressed				
	F	%	F	%			
1 Months	42	33.6	21	31.3	3.43	4	0.225
2 Months	76	60.8	34	50.7			
3 Months	6	4.8	9	13.4			
4 Months	0	0.0	3	4.5			
5 Months	1	0.8	0	0.0			
Total	**125**	**100**	**67**	**100**		**n=192**	

4.7.2.3 Commodities and Viral Load Suppression

The study sought to establish whether the health facility under study had commodities to test the following TB, C Meningitis, Diabetes, Hypertension, CD4 Count, liver function test, cancer treatment, syphilis and STI and manage the conditions as per the guidelines of adults HIV Positive clients who had more than 1000 viral load copies /microliter of blood having tested for small range of health conditions which included TB, C Meningitis, Diabetes, Hypertension, CD4 Count, liver function test, cancer treatment, syphilis and STI as compared to patients who were tested for various health conditions. The chi square results were χ^2= (1, n=192) =18.24, p=0.032). The study found that p-value was at 0.032. This showed that p value was less than .05 which indicated that commodities a significant correlates influencing viral load suppression which also influenced patient care management. The findings are as shown in Table 4.57

Table 4.57: Commodities Availability and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Test Availability	Suppressed		Not Suppressed				
	F	%	F	%	18.24		
Low Level Capacity to Test Medical Conditions	38	30.4	21	31.3		1	0.032
High Level Capacity to Test Conditions	87	69.6	46	68.7			
Total	**125**	**100**	**67**	**100**		**n=192**	

The following are qualitative statements from Key in formants regarding commodities and viral load suppression. Key emerging theme was that though proper HIV patient's management requires adequate availability of commodities key informants stated the following.

"These facilities suffer seriously from stock out of key commodities like paediatric ARVs, gloves, HIV test kits, and sometimes CD-4 Counts kits and that why we do not have adequate data for CD-4 Count."

Another key informant stated the following;"

"We are worried that most that most of HIV support is from donors and there is a danger of them pulling out and thus we need to rethink of owning this program"

On availability of health information systems and records which is important for data generation and utilization a key informants stated the following "*Availability of Electronic Medical Records is making work easier, however we need more desktops to*

*work on", "*Another key informant said*." there is always a meeting for review of data at the County level"*

4.7.2.4 Training and Viral Load Suppression

The study sought to establish how HIV positive adults on care perceived the competence of Health service provider during the initial visit to HIV care in the facility in terms of skills and training and how it is related with HIV correlates of Viral load suppression. The guidelines require the health care workers to completely provide information and examine HIV positive clients on below underlining health issues from the clients. The study established there was no significant difference between adults HIV Positive clients who had more than 1000 viral load copies /millilitre of blood with those with low viral load suppression of less than 1000 viral load copies/ millilitres of blood on perception of health workers ability to diagnose, treat and provide health information, while those clients with positive perception. The chi square results were χ^2= (1, n=192) =4.08, p=0.22). The study found that p-value was at 0.22. This showed that p value was greater than .05 which indicated that competence of staff in terms of training was not a significant correlates of viral load suppression. The findings are as shown in Table 4.58

Table 4.58. Training and Viral Load Suppression

Variable							
	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Competence Perception	Suppressed		Not Suppressed		4.08	1	0.22
	F	%	F	%			
Competencies	30	24.0%	11	16.4			
In competencies	95	76.0%	56	83.6			
Total	**125**	**100**	**67**	**100**		**n=192**	

The following are qualitative statements from Key in formants regarding training and viral load suppression. The guidelines requires continuous updates for not less than a year where health care workers must be refreshed and trained on an emerging issues.

One of the emerging themes was that facility staffs have received adequate HIV training as stated by one of the key informants.

"*I have gone for several HIV training like Kenya HIV quality framework, Kenya quality model for health, New ARVs guidelines and TB co-infection, this is because am employed by Afya Bondeni and for them they train their staff*"

Another key informant said, "*There is a gap in HIV management training for emerging diseases such as non-communicable diseases which affects interfere with HIV management*"

Though the guidelines requires continuous updates for not less than a year where health care workers must be refreshed and trained ,a key informant stated as follows;

"We are worried because of those who are trained are employed by programs and there is risk of creating skill gaps after ending contracts which normally occur".

4.7.2.5 Leadership and Viral Load Suppression

The study sought to assess whether health facility leadership contributed to viral load suppression of HIV positive adults on care at the study site. The study found that there was more proportion of adults HIV positive clients with less than 1000 viral copies/microliter of blood at 73.7% for clients for clients who were satisfied with leadership ability to offer satisfaction to HIV Clients while at the same than those who were not satisfied at 26.3%.

At the same time there were more proportion of adults HIV positive clients with more than 1000 viral copies/microliter of blood at 62.7%% for clients for clients who were dissatisfied with leadership ability to offer satisfaction to HIV Clients

Satisfaction of patients was found to be significant in influencing viral load suppression in the facility. The chi square results were χ^2= (1, n=192) =13.44, p=0.00). The study found that p-value was at 0.00. This showed that p value was less than 0.05 which indicated that period of tests was a significant correlates of viral load suppression. The degrees of freedom are equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degrees of freedom is (4-1) (2-1) = 3. The findings are as shown in Table 4.59.

Table 4.59 Leadership and Viral Load Suppression

Variable	What is your current Viral Load Today?				Chi Square χ^2	DF	P Value
Client Satisfaction	Suppressed		Not Suppressed		13.44	1	0.020
	F	%	F	%			
Low Satisfaction	15	12.0	22	32.8			
High Satisfaction	110	88.0	45	67.2			
Total	**125**	**100**	**67**	**100**		**n=192**	

The following are qualitative statements from Key in formants regarding leadership and viral load suppression.

"The facility has quality improvement team that meet to discuss HIV activities"

The guidelines say that the team is chaired by the facility continuous quality improvement leader and supported by the County and implementing partners.

Other key informants stated the following;

"The HIV coordinators who is at the sexual and gender based violence department has been nominated to coordinate quality improvement activities"

Other key informants stated "*Yes, quality improvement team compromising of implementing partners e.g. Afya bondeni*

Other key informants stated the following;

"*There exist quality improvement team with support from implementing partners who meet regularly to discuss matters such as suppression rate, clients waiting time, retention, linkages, ARV, and we keep record".*

Concerning the issue of leadership and governance key informants stated the following "*the whole management of HIV programs is left to donors"*

The guidelines require a six months period of implementation of the identified quality improvement gaps to improve patients care as stated by key informants;

"we have identified ways of improving patients care by coming up with HIV indicators like retention rate, centralized care, viral load suppression, ART Optimization, low yield positivity , keeping appointments and picking drugs on time.

Other key informants stated the following;

"Apart from what my colleagues has stated we had just completed out previous 6 months indicators and some indicators have been carried forward to this quarter like positivity yields, Decentralized care uptake and operation triple zero

4.7.2.6 Staffing Ratio and Viral Load Suppression

The study sought to find out whether staffing ratio of the hospital in Naivasha general hospital.

The study sought to establish whether they were adequate trained staffs to conduct effective quality counselling. Counselling is important among HIV positive adults on care in promoting ARV adherence. The guidelines provides direction on specific health issues amongst HIV positive clients ranging from initial visits counselling , nutrition and diagnosis to linkage amongst others. This require adequate staffing, The study found that there was no association of the number of hours utilized for counselling and the viral load suppression amongst HIV adult clients on care prior to the study such that the number of sessions/length of counselling did not affect viral load suppression, in this case the chi square results were χ^2 = (1, n=192) =1.983, p =0.3710). The study found that p-value was at 0.371. This showed that p value was more than 0.05 which indicated that period of tests was not significant correlates of viral load suppression. The findings are in Table 4.60.

Table 4.60: Staffing and Viral Load Suppression

Variable						
Duration of Counseling		What is your current Viral Load Today?		Chi Square χ^2	DF	p-value
		Suppressed	Not Suppressed			
Less than 30 minutes	Count	80	36			
	%	64.0%	53.7%	1.983	2	0.371
30-1 Hour	Count	40	27			
	%	32.0%	40.3%			
1 Hour-2 Hours	Count	5	4			
	%	4.0%	6.0%			
Total	Count	125	67			
	%	100.0%	100.0%			

The following are qualitative statements from Key in formants regarding staffing and viral load suppression. The guidelines require that there should be adequate staffs

working as per staff norm statements from key informants was as follows, stated by the key informants.

"There is acute shortage of staff and high staff turn-over in this facility as the one manning HIV Programs are supported by donors". Another key informant said *"though the health workers are devoted, they few".*

4.7.2.7 Infrastructure/ART regimen and Viral Load Suppression

The study sought to find out whether ART regimen was in line with guidelines and frameworks and also if they had infrastructural capacity to monitor efficacy of ARVs through sensitivity testing before changing to another regimen and proper commodity storage.

The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 82.1% taking second line medicine regime than first line at 17.9%. Similarly, there was more proportion of clients with viral load less than 1,000 copies/microliter of blood at 85.0% taking first line than second line at 15.0%. The study found that p-value was at .000. This showed that p value was less than .05 which indicated that treatment regime was a significant correlates influencing viral load suppression. The degree of freedom is equal to (r-1) (c-1), where r is the number of rows and c is the number of columns. For this example, the degrees of freedom is (2-1) (2-1) = 1. The study sought to find out the specific ART treatment regimen that is a prescribed and administered to Adult living with HIV clients associated with viral load suppression. According to guidelines first line treatment regimen is recommended for patients who are starting ART for the first line however in case of HIV viral load suppression failure and other factors the treatment regime can change. The

study found that most frequently prescribed medicines for adults HIV positive on care with less than 1000 HIV viral load copies were TDF/3TC/EFV which is first line which was accounted for by 47.2% of clients, followed by TDF/3TC/NVP also first line as accounted for by 15.2% of clients and third TDF/3TC/DTG at 14.4% and forth was AZT/3TC/ATV which is 11.2.0%. While at the same time the study found that most frequently prescribed medicines for adult HIV positive on care with more than 1000 HIV viral load copies TDF/3TC/EFV40.3%, second was TDF/3TC/NVPat20.9% and AZT/3TC/ATV at 16.4%. The chi square results were χ^2= (1, N=192) =18.66, P=0.00). ART regimen was therefore found to be significant correlates of viral load suppression in the facility. The findings are in Table 4.61.

Table 4.61: ART Treatment Regimen and Viral Load Suppression

Variable							
	What is your current Viral Load Today?						
ART Drugs Name	Suppressed		Not Suppressed				
	Count	%?	Count	%	Chi Square χ^2	DF	P-Value
ADF/3TC/EFV	3	2.4%	0	0.0%			
AZT/3CT/ATV	0	0.0%	1	1.5%	18.66	5	0.00
AZT/3CT/LDV	0	0.0%	1	1.5%			
AZT/3TC/ATV	14	11.2%	11	16.4%			
AZT/3TC/LDV	1	0.8%	0	0.0%			
AZT/3TC/NVP	1	0.8%	1	1.5%			
TDF/3TC/ATV	7	5.6%	4	6.0%			
TDF/3TC/ATVR	1	0.8%	0	0.0%			
TDF/3TC/DTG	18	14.4%	8	11.9%			
TDF/3TC/EFV	59	47.2%	27	40.3%			
TDF/3TC/NVD	2	1.6%	0	0.0%			
TDF/3TC/NVP	19	15.2%	14	20.9%			
Total	**125**	**100.0%**	**67**	**100.0%**			

4.7.3 Health System Factors Associated with Viral Load Suppression

Multivariate analysis was employed to assess the system factors associated with viral suppression Among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County. Multiple logistic regression models sought to reveal whether Health systems consist of structures and processes whose primary objective is to promote, restore and maintain health. Health systems factors include status of health care facilities, commodities, health care legislation, standards, policies, and regulations, resources (which includes fiscal, human facilities and sites as well as education of health workers.

The research utilised logistic regression in form of odd ratio (OR), which is used to measure the association between chance of exposure and the outcome. The Odd ratio is counted by comparing the likelihood of something occurring as compared to the odds of something not occurring. In this case the research is comparing the relative odds of viral load suppression occurring or not occurring based on adults. Health systems factors include status of health care facilities, commodities, health care legislation, standards, policies, and regulations, resources (which includes fiscal, human facilities and sites as well as education of health workers. The aim is to establish whether health systems factors can influence magnitude or risk of viral load suppression. The validity of odd ratio is measured using a threshold of 95% confidence interval (CI) which is used to estimate the precision of the OR. A large CI is regarded as a measure of a low precision of the OR, where as a small CI indicates a higher precision of OR.

Table 4.62: Logistic Regression Analysis of Clients Health and Viral Suppression among HIV Positive Adults on Care in Naivasha Sub-County Hospital, Nakuru County.

Predictors		Odd Ratio	Lower Bound	High Bound	P value
ART Regimen infrastructure	First line	1.929	0.937	3.968	0.00
	Second line	0.746	0.657	1.929	
Patient Management	Scheduled Visit	55.028	0.060	115.366	0.04
	Unscheduled Visit	41.797	0.055	68.384	
Training	Competent	43.841	0.013	72.820	0.22
	Somewhat Competent	11.471	0.112	36.018	
	Not Competent	39.308	0.344	105.875	
	Somewhat incompetent	87.727	0.190	116.946	
Guidelines	1 Months	105.302	0.220	213.905	0.02
	2 Months	31.575	0.121	67.012	
	3 Months	95.887	0.107	115.366	
	4 Months	112.00	0.091	211.769	
	5 Months	15.141	0.23	67.212	
Adequacy Staffing	Half 1 Hour and less	12.970	0.107	35.000	0.37
	30 min-1 Hour	10.00	0.60	16.670	
	1-2 Hour	-29.536	0.112	109.178	
	Above 2 Hours	13.062	0.91	54.189	
Leadership	Very Satisfied	-15.735	0.60	67.559	0.00
	Satisfied	11.471	0.114	115.047	
	Very Dissatisfied	39.308	0.127	68.212	
	Somewhat Dissatisfied	87.727	0.325	222.820	
Commodities/facility	Yes	89.00	0.190	168.012	0.02
	No	-54.89	0.024	54.228	
	n=192				

The findings indicated that the odds of viral load suppression 3 times likely to be achieved using first line ART regimen at (OR 1.929, 95% C.I = 0.937-3.968) than second line regimen which had odd ratio of (OR 0.746, 95% C.I = 0.657-1.929). This implies that there should be mechanism to provide first line regimen that will provide maximum outcome within a very short time of initiation and use.

The findings indicates that scheduled visits had a likelihood outcomes of viral suppression amongst HIV Positive clients (OR 55.028, 95% C.I = 060-115.366) as compared to unscheduled visits at OR 41.797, 95% C.I = 68.384).

The study established high 10 times likelihood of achieving viral suppression by following guidelines on viral load testing with (OR 105.302, 95% C.I = 220-213.905) as compared to not following guidelines (OR 15.141, 95% C.I = 0.23-67.212).

The study established the odds of not achieving viral suppression is three likely to happen in facility with poor leadership at (OR 87.727, 95% C.I = 0.325-22.820) as compared to facilities with good leadership (OR -15.15.735, 95% C.I = 0.60-67.559).

The study established the odd of achieving viral suppression is twice likely to happen in facility with sufficient commodities at (OR 89.00, 95% C.I = 0.190-168.012) as compared to facilities with insufficient commodities (OR -54, 89% C.I = 0.024-54.228).

4.8 Predictors Associated With Viral Load Suppression

The section contains the analysis of fourth objective of the study which was to determine the predictors associated with viral suppression. The overall model coefficient was 0.529 (52.9%), at p-value=0.000, which implies that factors under study were able to predict the viral load suppression significantly. The p value was significant which implies that the model was able to predict variation of viral load suppression at 95% confidence interval level.

Amongst socio-demographic factors, occupation of HIV positive adults under study was found to have highest impact in viral load suppression with βeta = 0.141(14.1%), t =2.062, p =0.04), which means 13.9% variation of viral load suppression can be

predicted by occupation of HIV positive adults clients attending the facility under study which is followed by distance to the facility which was found to predict 13.2% variation in viral load suppression with βeta = 0.132(13.2%), t =1.914, p =0.05). Parity of adult HIV positive clients was found to be partially predicting viral load suppression with βeta = 0.120(12.0%), t =1.787, p =0.07).

Amongst client health factors the best predictor was clients ability to Adherence to ART treatment which was found to predict 27.8% of variation in viral load suppression in the study area with βeta = 0.278(27.8%), t =4.019, p =0.00). This is followed by HIV positive clients comorbidities/co-infection status which was found to predict 21.2% of variation of viral load suppression (βeta = 0.218(21.8%), t =3.131, p =0.002).

Amongst health system factors infrastructure/ART regimen was found to be the most critical predictor of viral load suppression with 18.1% (βeta = 0.181, t =2.585, p =0.011). Leadership of the facility and HIV Programs was found to predict 12.2% of viral load suppression, though was partially significant with a βeta = 0.122, t =1.723, p =0.087).

Table 4.63 Predictors Associated With Viral Load Suppression among HIV Positive Adults

		Predictors				
Model l	Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	.509	.340		1.498	.136
	Parity	.051	.029	.120	1.787	.076
	Occupation Status	**.133**	**.065**	**.141**	**2.062**	**.041**
	Monthly Income	-.032	.024	-.091	-1.311	.192
	Distance	**.070**	**.037**	**.132**	**1.914**	**.050**
	Turn Around Time of Viral load results	.017	.041	.029	.419	.676
	Co-infection	**.033**	**.010**	**.218**	**3.131**	**.002**
	Nutrition	-.043	.027	-.116	-1.613	.108
	Number of Sexual Partners	.011	.029	.028	.378	.706
	STI Incidence	.000	.024	-.001	-.018	.986
	Disclosure	-.006	.007	-.063	-.843	.401
	Adherence	**.208**	**.052**	**.278**	**4.010**	**.000**
	Partners ARV adherence	-.026	.024	-.085	-1.099	.273
	Treatment Category of Visit	.110	.084	.089	1.308	.193
	Duration of Tests	-.005	.050	-.007	-.095	.925
	Leadership	**-.148**	**.086**	**-.122**	**-1.723**	**.087**
	Infrastructure ART treatment Regimen Type	.217	.084	.181	2.585	.011

Dependent: What is your current Viral Load Today?

CHAPTER FIVE: DISCUSSION, CONCLUSIONS, AND RECOMMEDATION

5.1 Introduction

The chapter discusses the summary of the findings, discussion, conclusion and the recommendation based on the findings of the study. The discussions are based on the objective of the study and the themes derived from the research process.

5.2 Discussion

5.2.1 Socio-Demographic Factors Associated with Viral Load Suppression

The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 50.4% for clients working in informal sector than formal sector. Therefore the differences based on occupation seemed to differ significantly; the study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 41.6% for clients with less income of 1-5,000 as compared to any other higher income level. Similarly the proportion of clients with viral load greater than 1,000 copies/microliter of blood and less than 1,000 viral copies /microliter of blood seemed to differ significantly based on income of clients.

The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 64.2% for clients who live at a distance of more than 5 km as compared to those who live either within 5km or less. Similarly the proportion of clients with viral load greater than 1,000 copies/microliter of blood and less than 1,000 viral copies/microliter of blood seemed to differ significantly based on distance of home to facility.

The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter of blood at 68.7% for family with more than 4-5 children than any other groups. Similarly the proportion of clients with viral load greater than 1,000 copies/microliter of blood and less than 1,000 viral copies /microliter of blood seemed to differ significantly based on household size. Low parity and young women are more likely to be non-suppressed when equated to the rest of adult age sets. The study found that socio economic status of patients which included occupation and income of adult living with HIV in study area affects viral load suppression. In that study cost of treatment was found to have very serious implication to treatment regime, at the same time the study found that found security was found to affect significantly adherence to HIV/AIDS and a predictor to high viral load.

The study agree with several studies by V. G. et al., (2016), who found that socio economic status of patients which includes occupation, income group, and education level affects their ability to adhere to treatment regime, since the cost of treatments in Botswana used to have very serious implication on outcome of HIV treatment. The study also agree with a study done in Uganda by Kahana et al., (2015), which indicated that socio economic status of patients is related with high viral load, especially food security was found to affect significantly adherence to HIV/AIDS a well as worsen it side effects. A study by Blumstein (2015), found that Socio demographic factors are defined as factors related with socio status and economic wellbeing of an individual(Blumstein, 2015). Baseline so-demographic features have been shown to effect viral load suppression in clients attending facilities (Rangarajan et al., 2016). The study found that there was more proportion of adults HIV positive clients with over more than 1000 viral copies/microliter

of blood at 64.2% for clients who live at a distance of more than 5 km as compared to those who live either within 5km or less. Similarly the proportion of clients with viral load greater than 1,000 copies/microliter of blood and less than 1,000 viral copies /microliter of blood seemed to differ significantly based on distance of home to facility.

A study in Uganda by Kahana et al., (2015), indicated achievement of viral load was associated with access to health facility as factors, especially distance of patients towards health facility, with those within the range of 0-5km found to have best chances of adherence with an odd ratio of 3, while those within a range of 5-10 were found to adherence to ARV with odd ratio of 1.

5.2.2 Clients Health Related Factors Associated with Viral Load Suppression

The study found that there were more proportion of adults HIV positive clients with more than 1000 viral load copies/microliter of blood who either were not sure if their nutrition intake status at home had impact on medicine adherence than those who either agreed or strongly agreed This study agreed with one by Naidoo et al, (2018), who undertook a study in Kwa Zulu Natal South Africa and found that nutrition associated with mortality in infected patients initiating ART and viral load suppression. The study found out that Adherence to antiretroviral therapy is to some extent connected with viral suppression. It was also concluded that, disclosure is important factor for viral load suppression. The disclosure was found to be having a strong correlation with viral suppression which has strong association with viral suppression. The study agree with other studies (Brown et al., 2013) indicated that adherent patient have much better coping mechanisms and less depression episodes.

The ability of patients to follow through the treatment is related with their ability to adhere to prescriptions and related instruction, this is especially important in matters pertaining to HIV managements, where by lower adherence is normally associated with likelihood of reporting or scheduling health care appointments or prescriptions, this is also related with following treatment regiment, higher adherence is associated with high chance of likelihood of viral suppression.

In this study it was found that there exists high risk of viral load for patients with cross infection which included TB, Meningitis and possibility of existence of viral load. The study found cross association between adherence with medication adherence and this is a critical accompaniment in treatment of HIV and other medical conditions, in this case adherence should be examined in terms of ability of HIV patients to undertake medication and ability of health workers to follow guidelines, protocol and plans for treatment, monitoring of HIV progression and viral load suppression. The study found association between counselling and availability of group support and other, the psychological issues in this case were noted as depression, anxiety and general malaise related with patients perception of one's ability to follow medication regimen which in turns affect AR adherence. The ability of patients to follow through the treatment is related with their ability to adhere to prescriptions and related instruction, this is especially important in matters pertaining to HIV managements, where by lower adherence is normally associated with likelihood of reporting or scheduling health care appointments or prescriptions, this is also related with following treatment regiment, higher adherence is associated with high chance of likelihood of viral suppression. The study found that there was more proportion of adults HIV positive clients on care with

more than 1000 viral copies in HIV positive adults for clients who had exposure of STI than those with no previous exposure of STI. The study also found that there was more proportion of adults HIV positive clients on care with more than 1000 viral copies in HIV positive adults with more than sexual partners than those with one partners or no partner. The study agree with one by Huerga et al., (2017), carried out a study in rural communities of South Africa, Kwan-Zulu Natal, using both qualitative and quantitative methods, the study utilized 400 patients and found that in almost half of participants cited issues of lifestyles, sexual behaviours as a critical factor predicting viral load.

5.2.3 Health System Factors Associated with Viral Load Suppression

The study established significant association of adults HIV Positive clients that had more than 1000 viral load copies /millilitre of blood and exhibiting irregular visit to the health facility under study during the study period. Also the study found that HIV positive clients with less than 1000 viral load copies/microliter of blood had regular / scheduled visits.

The study established significant association of adults HIV Positive clients who had more than 1000 viral load copies /millilitre of blood with their longer turnaround time of receiving their HIV Viral load test results.

Also the study found that there was a significant association of adult HIV positive clients who had less than 1000 viral load copies/ millilitre of blood and their shorter turn-around time of getting HIV Viral load test results. Study also showed that p value was less than .05 which indicated that turn-around time was a significant correlates influencing viral load suppression. A recent published medical journal L'Engle*et* al.,(2015),showed a clear

correlation between HIV viral load incidence and how ready facilities are to manage Quality HIV care. The most important health system factors in relation to PLHIV were found to be the infrastructure, geographic location, commodities and hospital protocols and procedures. The study also found that visibility and leadership within the facility as a critical factors for quality health care.

The study established significant association of adults HIV Positive clients who had more than 1000 viral load copies /millilitre of blood having tested for small range of health conditions which included TB, C Meningitis, Diabetes, Hypertension, CD4 Count, liver function test, cancer treatment, syphilis and STI as compared to patients who were tested for various health conditions. A Brazilian study showed that different level of structures, infrastructure and commodities affect diagnostic activities of a facility (Pascom et al., 2014). The study established significant association from adults HIV Positive clients who had more than 1000 viral load copies /millilitre of blood with their negative perception of health workers ability to diagnose, treat and provide health information, while those clients with positive perception to health workers competence were associated with low viral load suppression of less than 1000 viral load copies/ millilitres of blood.

Satisfaction of patients was found to be significant in influencing viral load suppression in the facility. The findings agree with another study done through World Health Organization by O. G. et al., (2017), has found that HIV Viral load suppression is associated with facilities which has excellent access to health care, critical governance, high satisfaction of health workers, socio consecutiveness in work place and work ration. Health care facilities should utilize guidelines and protocols in order to understand policies gap relative to WHO, UNAIDS framework for quality health care for HIV/AIDS

in order to create assurance of service delivery, standardizations and create room for benchmarking with best practices of quality care.

The study found that only 16 out of 192 clients on HIV care had their initial CD4 report available in their files and electronic data media. The study found that 5 out 11 adults HIV positive clients had CD4-Count <=200 and had viral load suppression of more than 1000 viral load copies/ millilitre of blood, while 11 out of 16 had CD 4 count>200 with viral load less than 1000 copies/ microliter of blood.

Lack of CD 4 data affects patient's management especially during classification of differentiated care. This may also implies lack of ability of hospital systems to manage infrastructure which includes data, networks, structures and processes.

The study found that there was association of the number of hours utilized for counselling and the viral load suppression amongst HIV adult clients on care prior to the study such that where in cases where staffs were able to commit a lot of time for counselling the outcome of having high viral load suppression and the converse was found to be true.

The study also found that most frequently prescribed medicines for adult HIV positive on care with less than 1000 HIV viral load copies were TDF/3TC/EFV which is first line which was accounted for by 47.2% of clients, followed by TDF/3TC/NVP also first line as accounted for by 15.2% of clients and third TDF/3TC/DTG at 14.4% and forth was AZT/3TC/ATV which is 11.2.0%. While at the same time the study found that most frequently prescribed medicines for adult HIV positive on care with more than 1000 HIV viral load copies TDF/3TC/EFV 40.3%, second was TDF/3TC/NVP at 20.9% and AZT/3TC/ATV at 16.4%. According to guidelines first line treatment regimen is

recommended for patients who are starting ART for the first line however in case of HIV viral load suppression failure and other factors the treatment regime can change.

5.2.4 Predictors Associated With Viral Load Suppression

The study found that amongst socio-demographic factors associated with viral load suppression ,occupation of HIV positive adults under study had the highest impact in viral load suppression with βeta = 0.141(14.1%), t =2.062, p =0.04), which means 13.9% variation of viral load suppression can be predicted by occupation of HIV positive adults clients attending the facility under study which is followed by distance to the facility which was found to predict 13.2% variation in viral load suppression with βeta = 0.132(13.2%), t =1.914, p =0.05). Parity of adult HIV positive clients was found to be partially predicting viral load suppression with βeta = 0.120(12.0%), t =1.787, p =0.07). Amongst client health factors the best predictor was clients ability to Adherence to ART treatment which was found to predict 27.8% of variation in viral load suppression in the study area with βeta = 0.278(27.8%), t =4.019, p =0.00). This is followed by HIV positive clients comorbidities/co-infection status which was found to predict 21.2% of variation of viral load suppression (βeta = 0.218(21.8%), t =3.131, p =0.002).

Amongst health system factors infrastructure/ART regimen was found to be the most critical predictor of viral load suppression with 18.1% (βeta = 0.181, t =2.585, p =0.011). Leadership of the facility and HIV Programs was found to predict 12.2% of viral load suppression, though was partially significant with a βeta = 0.122, t =1.723, p =0.087). This is followed by HIV positive clients comorbidities/co-infection status which was found to predict 21.2% of variation of viral load suppression (βeta = 0.218(21.8%), t =3.131, p =0.002).

5.3 Conclusion

From the findings, the following were the conclusions summarised based on the four objectives.

i. The study found there was statistical significant association between client's socio-demographic correlates and viral load suppression; the following factors were significant parity, income, occupation and distance to facility.
ii. The study found there was statistically significant association between client health related correlates and viral load suppression, the following factors were significant, co-morbidities/ co-infection, nutrition, number of sexual partners, disclosure, STI incidence, adherence to treatment, Partners failing to adhere to treatment and duration for HIV testing.
iii. The study found there was statistical significant association between health system factors and viral load suppression; the following were significant patient's management, guidelines, commodities, leadership and infrastructure/ART regimen.
iv. The study found the following factors to be critical predictors associated with viral load suppression; distance to facility, occupation, adherence, and co-morbidity, leadership of facility and ARV regimen.

5.4 Recommendation

i. There is need of policy makers at County Level to develop policies that focus on clients centred management of viral load suppression based on individual socio demographic factors which includes, occupation, parity and income of HIV Clients, literacy level, BMI, adherence level, information level, parity, gender.

ii. The county level should advocate to the facilities on proper use of guidelines and come up with new innovations of patient's management through evidence based approach on the existing policies.

iii. There should be improved coordination and programs ownership at facility and County level that will foster continuity of services

iv. Facilities to develop protocols on drugs sensitivity testing before changing regimen especially clients with high viral load.

5.5 Suggestion for Further Research

i. Replication of this study to other Counties.

ii. Conduct cohort study to establish efficacy of decentralized patient management at community versus convectional health facility

iii. An in-depth study to find out correlates of non-communicable diseases and HIV management

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APPENDICES

Appendix I: Informed Consent Form for Participants

Title of study: Correlates of HIV Viral Load Suppression among HIV Positive Adults on Care in Nakuru County, Kenya

Name of Research Leader: Rocky Jumapili

Name of organization/institution: A Masters Degree in Public Health Systems Management and Application at Kenyatta University

Introduction

Good morning/afternoon,

I am Rocky Jumapili, A student perusing Master's Degree in Public Health Systems Management and Application at Kenyatta University. I am undertaking a research which aims at determining correlates of HIV Viral load suppression among HIV Positive adults on care in Nakuru County. I kindly request you to assist in making this research a success; this will be by answering some questions from set of tools presented to you. The research gives a room to consent by signing the consent form. . You are entitled to ask and seek for information about the purpose of the study, possible risks and benefits, your rights and limits as volunteer and anything else that can make you comfortable. Once you are satisfied with the clarity of the research you will be given an opportunity to sign your name on the form provided.

Purpose of the research: The main objectives of this study is to determine Correlates of HIV Viral Load Suppression among HIV Positive Adults on Care in Nakuru County

Procedure: To participate in the study you will be required to write your concerns in the part of the research project. If you agree to participate in the study kindly sign the form provided for the consent purposes. The interviewer will ask you several questions concerning Correlates of HIV Viral Load Suppression among HIV Positive Adults through questionnaire. You will be free to ask questions where you do not understand.

Risks and discomforts: The study has made all reservations with aims of ensuring that the participants are under no circumstances being exposed to any risk since there are no single invasive procedures that will be carried out during the process of study.

Benefits of the study: This research is meant to benefit the society by coming up with the conclusion on the research topic, where as there is no direct benefits to the participants in terms of monetary, but your decision to consent will help society in HIV Viral suppression management. The results will also be used to inform and guide policy makers in HIV management.

Confidentiality: The research has put measures which ensure that privacy, confidentiality and ethics are followed to the letter, the name of participants shall not be recorded or used in the report and the data collected will be used only for academic research

Participation and withdrawal: As explained in the previous section your decision to participate in the study is voluntary. You can withdraw from participation at any time without giving any reason for withdrawal. Your refusal to participate or withdraw will not be recorded or interfere with services you receive in this facility

Who to contact: If you have any Query regarding the research or the nuances of the research you can make contact using the cell phone, email and physical locality given below

Researcher contact: **ROCKY JUMAPILI** **P.O BOX 200 KWALE** **EMAIL:** **JROCKIE2000@YAHOO.COM** **CELL: 0714-888879**	**Supervisor:** **DR. PETER KITHUKA** ***LECTURER,*** **KENYATTA UNIVERSITY** **CELL: +0722-358-103**	**THE SECRETARY,** **ETHICS AND RESEARCH COMMITTEE OF KU/ ERC,** **CELL: +**

Confirmation of your consent to participate

Do you agree to participate?

YES--------------------------------------- NO------------------------------

STATEMENT OF CONSENT

Participant's statement:

I have been briefed and read the details about the incoming research. I was given opportunity to seek information where by all the Questions I asked were answered to my satisfaction. The detail concerning the possible risks and benefits of the research has been explained in details. I now understand that I am participating in the research as a volunteer and I may withdraw from the study at any one time without consequences.

I now feel I can participate willingly in this research. I now understand that all the information I have availed regarding my identity will be kept in privacy and confidential.

By compliant to sign this consent form, I have agreed up any of the legal rights that I have as a participant in this research study.

I agree to participate in this research study: Yes No

I agree to provide contact information for follow up: Yes No

Participant Signature or Thumb stamp--------------------------------- Date-----------------

Researcher's Statement

Interviewer: I endorse that the reason, possible benefits and likely risks linked with participating in this research have been explain to the above member and the individual has consented to participate.

--------------------------------------- ------------------------- ------------------------------

Name Signature Date

Appendices II: Clients Questionnaire

SECTION A: SOCIAL DEMOGRAPHIC

1. Gender (1) Male ( ) (2) Female

2. What is your age……………………….

3. Marital Status

[ ] Married [ ] Single [ ] Divorced [ ]

4 How many children do you have?

[ ] 1-2 [ ] 2-4 [ ] 4-6 Others Specify

5. What is your occupation status?

[ ] Formal (Both Public and Private)

[ ] Informal

[ ] Other Specify

6. Education Level……………………………………..

7. Monthly Income

[ ] 1-5000 [ ] 5,000-10,000 [ ] 10,000-20,000 [ ] 20,000-50,000 > 50,000

8. How do you rate the Distance of your home to this facility?

[ ] Less than 5 KM [ ] 5 KM [ ] Over 5 km

9. What is your BMI (Body Mass Index) Check on the Register?

SECTION B: PATIENTS RELATED FACTORS

10. Recalling your HIV test, where were you tested

Facility-Specify	Community	Private Facility Specify	This facility

11. Indicate the period you were tested for HIV?

Less than 3 months ago	3-6 Months ago	6 Months-to-1 Year ago	More than 1 Year ago

12. Indicate your last viral load testing period

3 months ago	6 Months ago	1 Year ago	Not tested	Others specify

13. In your last viral load testing how long did you take to receive your results, specify.....

----

14. What was your last viral load copies tested?

Less than 1000 copies / Microliter of blood	
More than 1000 copies / Microliter of blood	

15. What is your viral load testing period today?

3 months	6 Months	1 Year	Others specify

16. Have you been tested for viral load today?

Yes [ ]   No [ ]

If no Go to 17

17. State the reasons for not tested --

----

18. Please tick appropriately the category of your visit today

Scheduled	
Unscheduled	

If unscheduled Go to 19

19. If unscheduled state the reasons for your visit today

----

20. What is your current viral load today?

Less than 1000 copies / Microliter of blood	
More than 1000 copies / Microliter of blood	

21. From your last HIV Test, How long did you take to start HAART?

1 Day to one week	2 weeks to 4 weeks	1 Months to 2 months	Four months and above

22. How long did you take your counseling sessions on HAART?

----

23. What did you discuss with your Doctor Today?---

----

24. How quickly did you get the results if tested today?

[ ] A Day [ ] More than a day [ ] 6-12 Hours [ ] 1-6 Hours [ ] others specify

25. How do you rate your overall agreement on what was discussed and examined during your initial visit with your provider on the following?

	Strongly Agree	**Agree**	**Strongly disagree**	**Disagree**
TB, Meningitis, Hypertension, Diabetes, Kidney, Liver Diseases				
Current Medication/ Concoction				
Drug Allergies				
ARV Exposure History				
Hospitalization History				
Family History				
Chronic Disease/ Cancer				
STI				

26. Among the above discussed which one was found to co-exist with your condition

[ ] TB [ ] Meningitis [ ] Diabetes [ ] Hypertension [ ] Traditional Medication [ ] Cancer [ ] STI Others .... None [ ]

27. Tick appropriately the last time you took the following?

	Less than week	1-2 weeks ago	2-4 weeks ago	1-2 Months ago	3-6 Months ago	None	Other specify
Alcohol							
Tobaccos							
Miraa							

Marijuana							
IDU							

28. My nutritional status at home is reasonable good to support my drug adherence.

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

29. How often does you have sex without using a condom?

All the time	Some Of The Time	Never Miss

30. How many sexual partners do you have in the last 6 months?

[ ] 1 Partner [ ] 2-3 partners [ ] 3-4 partners [ ] More than 4

31.How do you rate your overall understanding from your provider in your initial visit on the following?

	Very well	well	Very difficult	difficult
Sexual transmitted infections and symptoms				
The need to disclose your HIV status to your Sexual Partners				
Family planning and pregnancy planning				

Cervical cancer screening				
Prevention of other infections e.g. Malaria, safe water, immunization, mental illness				

32. Think of your last time you were treated for sexual transmitted infection?

1-2 Weeks	3- 6 weeks	2-4 Weeks	Others Specify

33. To whom did you disclose your HIV STATUS?

[ ] husband [ ] Wife [ ] Other Sexual Partner [ ] Father [ ] Mother [ ] Other Specify

34. In the Continuum of Care where else are you linked for support?

Community	Gender Based Services	Paralegal Services	Support Group

35. How often does you fail to adhere to your treatment?

All the time	Some Of The Time	Never fail

36. Tick appropriately if you were tested for the following during your care

TB	C Meningitis	Diabetes	Hypertension	CD 4	Liver Function	Cancer Screening	Syphilis and other STI	none

					test			

37. What was your CD 4 Count in your initial visit……………………

38. Please tick appropriately on your ART treatment Regimen and specify

First line	Second line
Specify…………………………	Specify……………………

39. Please tick appropriately on the HIV Status of your partner?

HIV +	HIV-	I don't know his or her HIV Status

40. How often does your partner fail in ARV adherence treatment?

All the time	Some Of The Time	Never Fail	Partner Not On Treatment	I don't know

41. Using a likert scale of 1-4 where, 1=very dissatisfied, 2=somewhat dissatisfied, 3=somewhat satisfied and 4=very satisfied, please rate your level of satisfaction on the HIV services you receive in this facility

Satisfaction Indicators	1=very dissatisfied	2=somewhat dissatisfied	3=somewhat satisfied	4=very satisfied

Staff Respect				
Staff Courtesy				
Staff Dignity				
Working Hours				
Clinic Schedule				
Treatment				
Counseling				

Thank You

Appendix III: Key Informants Interview Guide

SECTION A: BACKGROUND INFORMATION OF THE RESPONDENTS

1. Your Gender ? Male [ ] Female [ ]

2. Age of the participants: [ ] 18-29 Years [ ] 30-39 Years [ ] 40-49 Years [ ] Above 50 Years

3. Your Professional Qualification?

[ ] Post Graduate [ ] Undergraduate [ ] Diploma [ ] Certificate

If other please specify....................................

4. Number of Years in service in health care

Less than 4yrs ( ) 4-10yrs ( )11-15yrs ( ) Above 15yrs ( )

5. Years of service in this facility. Please tick appropriately

Less than 4yrs ( ) 4-10yrs ( ) 11-15yrs ( ) above 15yrs ( )

6. Marital Status

[ ] Married [ ] Single [ ] Divorced [ ] Widowed [ ] Others Specify

7. Position held currently in this facility: please tick appropriately

Doctors ( ) Facility Manager ( ) HIV coordinators ( ) Nurse ( )

Other Specify

8. Position held currently in this facility: please tick appropriately

Doctors ( ) Facility Manager ( ) HIV coordinators ( ) Nurse ( )

Other Specify

SECTION B: INTERVIEW GUIDE QUESTIONS

9. In your own opinion indicate whether there exists an active facility Quality Improvement Team in this facility that meet regularly to discuss HIV Indicators?…(Confirmed by Minutes)………………………………………………
…………………………………………………………………………

10. What are the HIV quality indicators for improvement do the team discuss?

……………………………………………………………………………………………

…………………………………………………………………………………..

……………………………………………………………………………………………

(Confirm by Minutes)

11.How often do you experience challenges in client's retention to care in this facility?.

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

12. How often do this facility experience stock out of ARVs and related commodities and state the commodities?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

13. What can community do to support HIV Care and Treatment in this facility…?……………….

…………………………………………………………………………….

14. How is the linkage to other services done in this facility (Especially HIV Clients)?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

15. Which HIV related training did you have an opportunity to attend in the last 6 months?

…………………………………………………………………………………………………

Appendix IV: Approval Letter from Kenyatta University

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 18th July, 2019

TO: **Rocky Jumapili Nakazea**
C/o Health Management & Informatics Dept.

REF: Q142//38700/2017

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 26th June, 2019 entitled **"Correlates of HIV Viral Load Suppression among HIV Positive Adults on Care in Nakuru County, Kenya".**

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

HARRIET ISABOKE
FOR: DEAN, GRADUATE SCHOOL

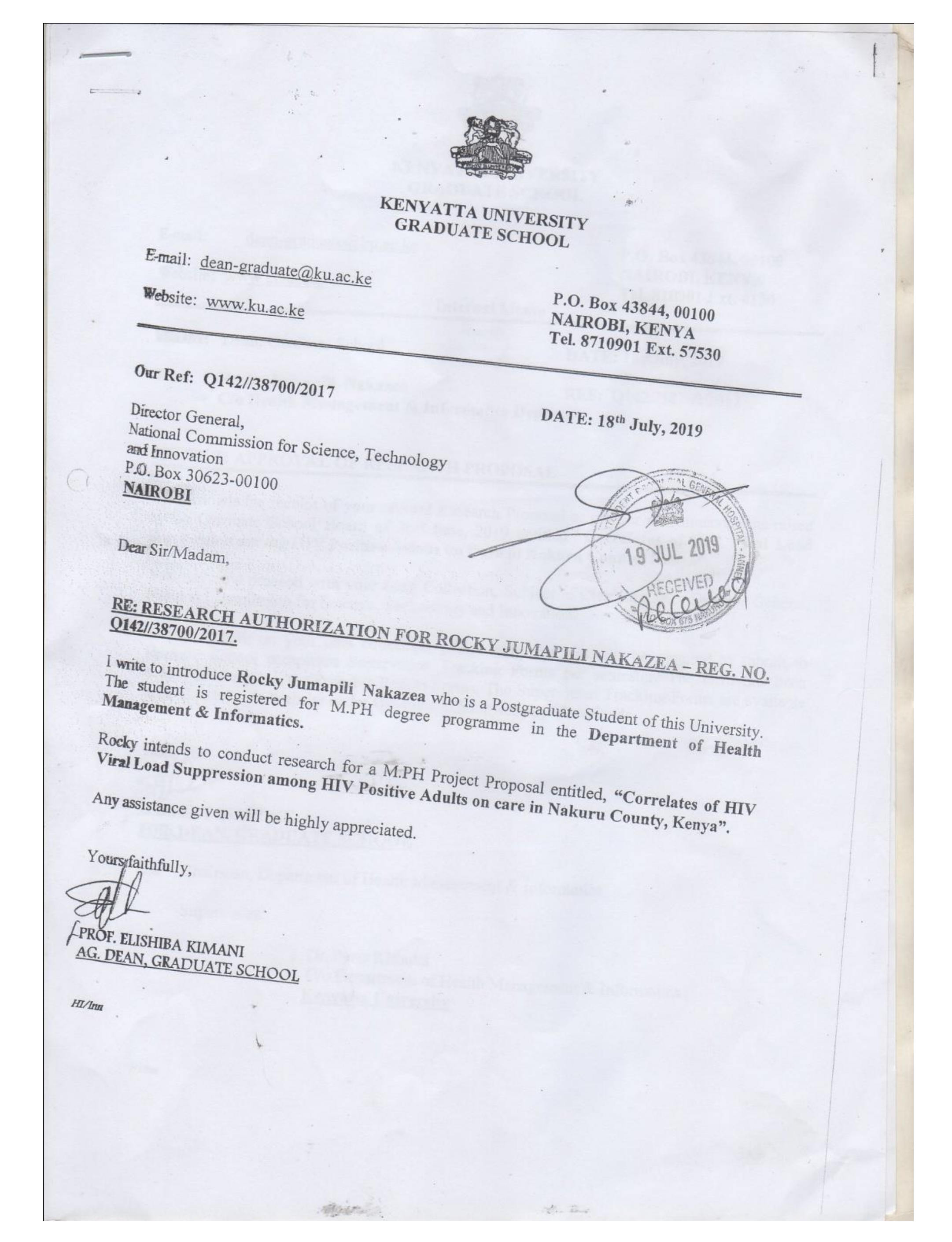
C.c. Chairman, Department of Health Management & Informatics

Supervisors:

1. Dr. Peter Kithuka
C/o Department of Health Management & Informatics
Kenyatta University

HI/km

Appendix V: Introduction to NACOSTI by Kenyatta University



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: Q142//38700/2017

DATE: 18th July, 2019

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR ROCKY JUMAPILI NAKAZEA – REG. NO. Q142//38700/2017.

I write to introduce **Rocky Jumapili Nakazea** who is a Postgraduate Student of this University. The student is registered for M.PH degree programme in the **Department of Health Management & Informatics.**

Rocky intends to conduct research for a M.PH Project Proposal entitled, **"Correlates of HIV Viral Load Suppression among HIV Positive Adults on care in Nakuru County, Kenya".**

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. ELISHIBA KIMANI
AG. DEAN, GRADUATE SCHOOL

HI/lnn

19 JUL 2019
RECEIVED

Appendix VI: Research Authorization from Department of Health, Nakuru County

DEPARTMENT OF HEALTH SERVICES

NAKURU COUNTY

CHIEF OFFICER, MEDICAL SERVICES
NAKURU COUNTY
P.O BOX 2600-20100
NAKURU

Ref No. NCG/CDMS/GEN.VOL.1/298

18th September, 2019

TO
MR. ROCKY JUMAPILI
KENYATTA UNIVERSITY

RE: RESEARCH AUTHORIZATION

This letter serves as an authorization from the Department of Health Services Nakuru for you to conduct research on ***"Correlates of HIV Viral load suppression among HIV positive adults on care in Nakuru County, Kenya".***

The study is in line with the County Research priorities in the county research agenda and therefore the researcher is expected to present and submit the final report to the County Research and Development Unit.

ELIZABETH KIPTOO
FOR/COUNTY DIRECTOR ADMIN & PLANNING
NAKURU

CC:

- All Medical superintendents
- All SCMOHs

Appendix VII: Field Supervisor Introduction Letter to Study Site

DEPARTMENT OF HEALTH SERVICES
NAKURU COUNTY

Email: pghnakuruannex@yahoo.com
Telephone: 0717 408 666
When replying please quote our

PROVINCIAL GENERAL HOSPITAL-ANNEX
P.O.BOX 675
NAKURU

Ref: NO.PGH/ANNEX/PT/VOL.III

3rd October, 2019

TO WHOM IT MAY CONCERN

RE: ROCKY JUMAPILI NAKAZEA

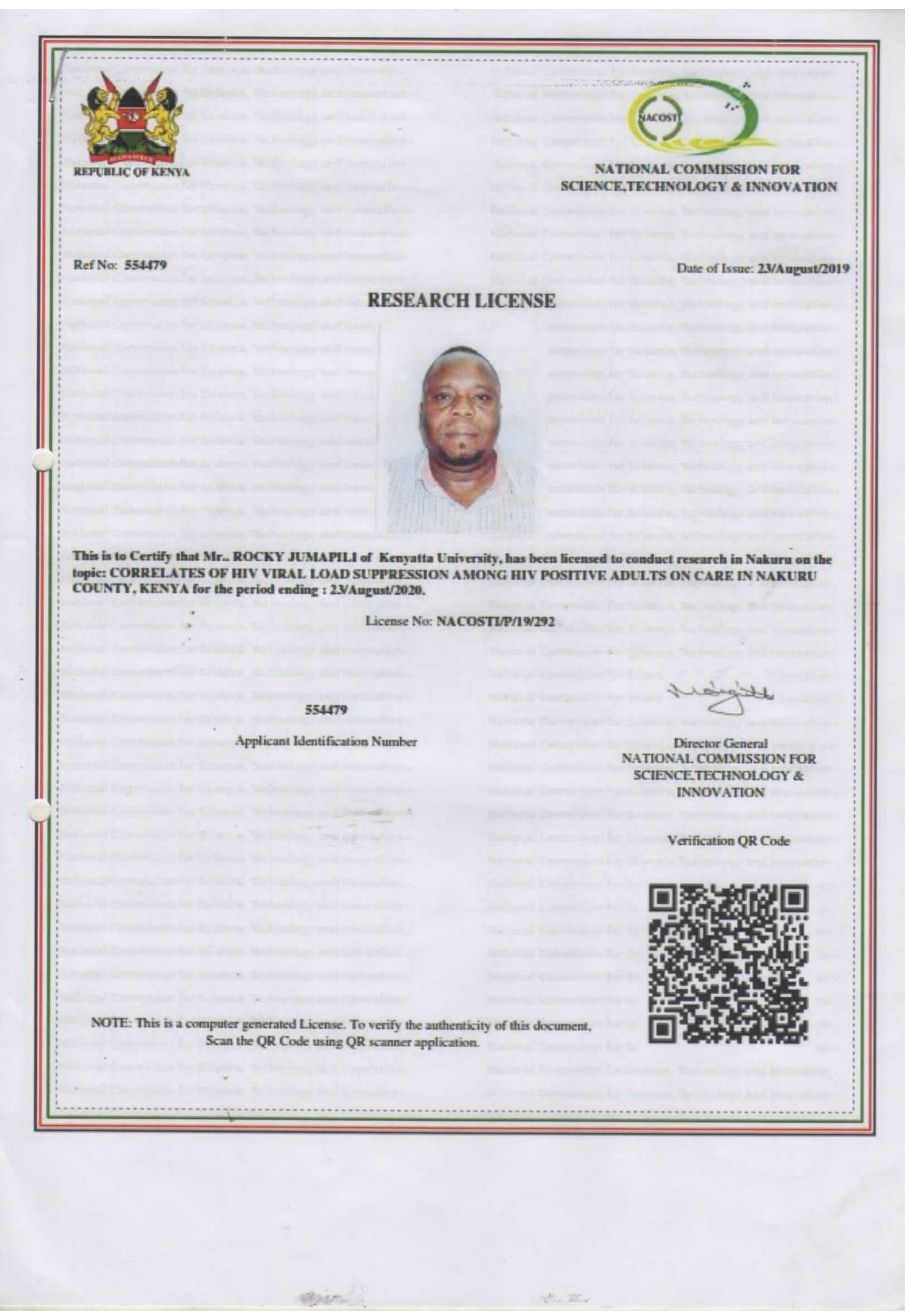
The above named is a Masters degree student pursuing MSC Health Systems Management at Kenyatta University, in Improving Public Health Management for Action (IMPACT)

He is attached in Nakuru County for his care competencies and research in the Department Of Health Services, he supervised by Dr. George Biketi and mentored by Dr. Solomon Sirma (COH) Health services

Kindly accord him the necessary assistance.

DR. GEORGE BIKETI
IMPACT SUPERVISOR (MEDICAL SUPERINTENDENT)

Appendix VIII: Research Permit



REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 554479

Date of Issue: 23/August/2019

RESEARCH LICENSE

This is to Certify that Mr.. ROCKY JUMAPILI of Kenyatta University, has been licensed to conduct research in Nakuru on the topic: CORRELATES OF HIV VIRAL LOAD SUPPRESSION AMONG HIV POSITIVE ADULTS ON CARE IN NAKURU COUNTY, KENYA for the period ending : 23/August/2020.

License No: NACOSTI/P/19/292

554479

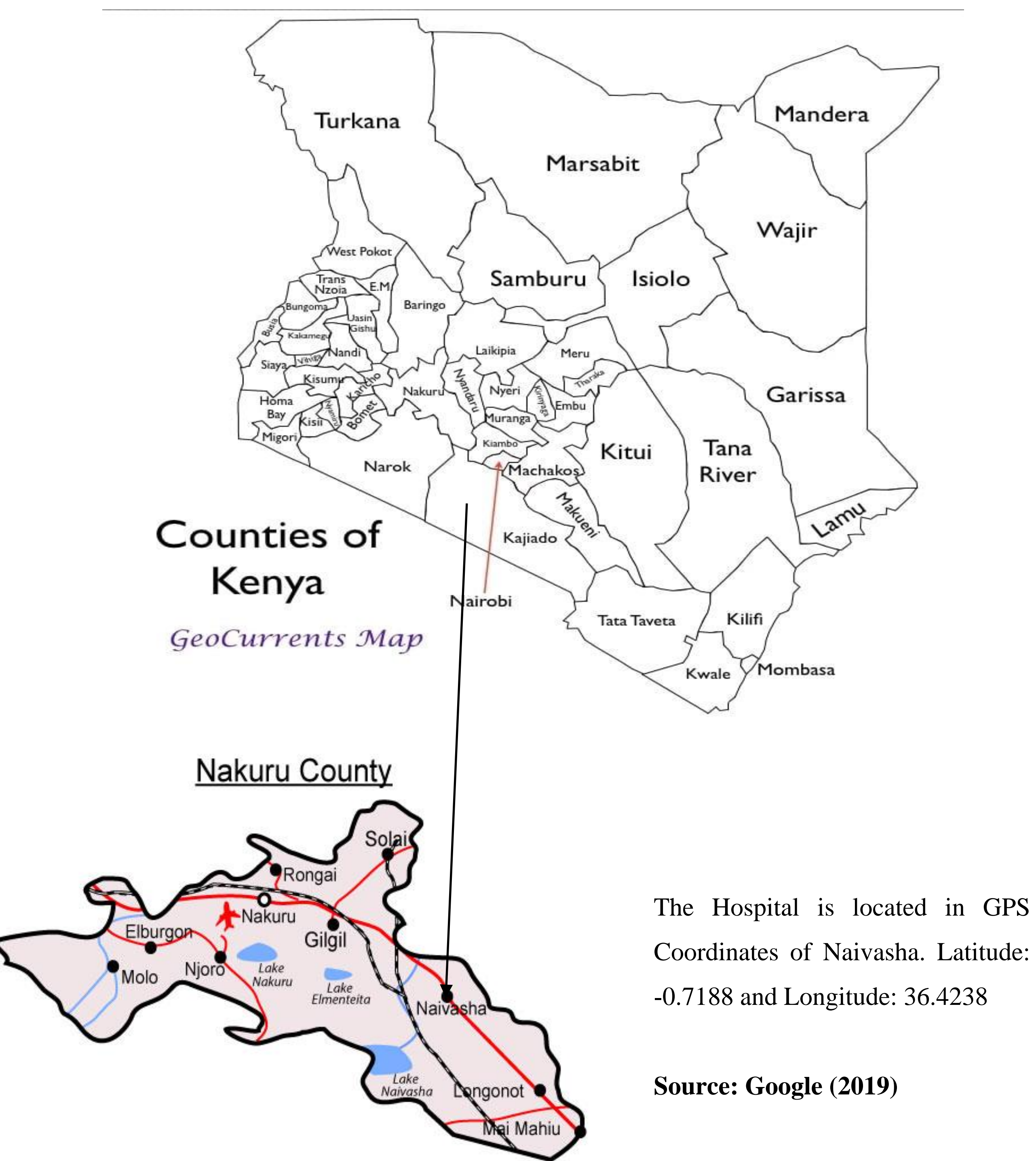
Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix IX: Map for Study Site



The Hospital is located in GPS Coordinates of Naivasha. Latitude: -0.7188 and Longitude: 36.4238

Source: Google (2019)