EFFECTS OF POST-ELECTION VIOLENCE ON HIV PATIENTS CARE AND TREATMENT IN SELECTED DISTRICTS IN CENTRAL, NYANZA AND RIFT VALLEY PROVINCES, KENYA, 2008.

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Effects of Post-Election Violence on HIV patients care and Treatment in Selected Districts in Central, Nyanza and Rift Valley Provinces, Kenya, 2008.

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Treatment
ARV	Antiretroviral Drugs
CBS	Central Bureau of Statistics
CDC	Centers for Disease Control and Prevention
CRF	Circulating Recombinant Form
CTX	Cotrimoxazole
DEPHA	Data Exchange Platform for the Horn of Africa
DNA	Deoxyribonucleic Acid
FBO	Faith Based Organizations
GOK	Government of Kenya
HAART	Highly Active Antiretroviral Therapy
HIV	Human Immunodeficiency Virus
IDP	Internally Displaced Person
IRIN	United Nations Office for the Coordination of Humanitarian Affairs, Integrated Regional Information Network
JKUAT	Jomo Kenyatta University of Agriculture and Technology

KDHS	Kenya Demographic and Health Survey
KAIS	Kenya AIDS Indicator Survey
KEMRI	Kenya Medical Research Institute
MMWR	Morbidity Mortality Weekly Report
MOH	Ministry of Health
MSF	Medecins sans Frontieres
NACC	National AIDS Control Council
NASCOP	National AIDS and STI Control Programme
NGO	Non-Governmental Organization
NNRTI	Non-Nucleoside Reverse Transcriptase Inhibitors
NRTI	Nucleoside Reverse Transcriptase Inhibitors
OR	Odds Ratio
PEPFAR	US President's Emergency Plan for AIDS Relief
PI	Protease Inhibitors
PMTCT	Prevention of Mother to Child Transmission of HIV
PPS	Probability Proportional to Size
RNA	Ribonucleic acid
SAS	Statistical Analysis Software
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV/AIDS

UNICEF	United Nations Children Fund
USIP	United States Institute of Peace
WHO	World Health Organization

ABSTRACT

Kenya, like other African countries, has been affected significantly by the HIV/AIDS epidemic. Kenya has been a leader in rapidly expanding access to HIV prevention, care and treatment, and great effort has been invested in developing national to facility-level systems to deliver prevention, care, and treatment services for HIV patients. In December 30, 2007; civil unrest broke out in several parts of the country after the presidential election results were announced. People fled their homes and health care services were disrupted. The effects of the post-election violence on HIV infected individuals and those on antiretroviral therapy (ART) are not clearly understood.

A cross-sectional study was carried out to determine the effects of post-election violence on HIV patients care and treatment in selected districts in Central, Nyanza, and Rift Valley provinces, Kenya. A total of 35 health facilities from 18 districts were selected using person proportion to size method. HIV patients were interviewed and facility records reviewed to asses the effects of the post-election violence. A standardized questionnaire was administered to the study participants. Odds Ratio (OR) was used to assess the strength of association between various risk factors and missing ART and chi square to test for statistical significance.

A total of 947 participants were interviewed. On analysis of factors that could have lead to patients missing treatment, there was significant increased risk of missing ART therapy among those who reported to have moved into different districts since December 30, 2007 (OR=2.6, p=0.002), unable to access health

care during the post-election violence period (OR=9.5, p<0.0001), having experienced physical violence personally (OR=2.7, p=0.0055) and having witnessed acts of physical violence (OR=2.0, p=0.02). For participants who had remained at the hospital of normal care they were less likely to miss ART (OR=0.3, p=0.002).

A Logistic regression model of factors that lead to patients missing treatment showed two factors that remained independent. There was an increased risk of missing ART among those participants who were unable to access routine health care (OR=5.25, p<0.0001) and care when ill (OR=3.81 p<0.0001).

The post-election violence had an effect on patients who were on ART. Inability to access health care and experiencing physical violence were important factors leading to participants missing ART treatment. This may have implications on ARV drug resistance and further research is needed.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Kenya lies along the equator in East-Central Africa. It is made up of 8 provinces – Central, Coast, Eastern, Nairobi, North Eastern, Nyanza, Rift Valley and Western.

The country's population of 37 million people consists of over 40 different ethnic groups (Yin & Kent, 2008; Haub, 2007). On December 30, 2007, unrest broke out following the announcement of the disputed presidential election results. The fighting between ethnic groups intensified in January 2008, with more than 800 people dying in violence across the country. Reports revealed that violent events were occurring in several parts of the country, especially throughout Western, Nyanza, Central, Rift Valley, Nairobi and Coastal provinces (DEPHA, 2008).

The violence was reported to be based on ethnic affiliation, mainly between the Kikuyu, Luo and Kalenjin communities. Thousands of people began fleeing their homes and heading to safer districts or provinces (UNICEF, 2008a). Many cases of trauma were witnessed with over 4,000 trauma cases in a 20 day period reported in some areas (MSF, 2008). Road blocks and general unrest caused business, government offices, health care facilities, and schools closures throughout the affected areas (WHO, 2008; Obonyo *et al.,* 2008). In the immediate post-conflict period, health services were being provided to

Internally Displaced Persons (IDPs) in numerous IDP camps. Conditions in the IDP camps were deplorable with poor sanitation, overcrowding, inadequate food rations leading to frequent diarrhea diseases and risk of communicable diseases (UNICEF, 2008b).

1.2 Statement of the problem

With more than 1.3 million Kenyans living with HIV, Kenya has been a world leader in expanding HIV services, with an extensive network of implementing partners throughout Kenya (US-PEFRAR, 2005; NACC, 2008). Relative political and social stability within Kenya over the last 20 years has created a favorable environment for HIV prevention and treatment interventions. The post-election crisis affected provinces that have the highest HIV prevalence, particularly Nyanza (CBS, 2004; NASCOP, 2008). Of these provinces, Central, Nyanza and Rift Valley, receive over three quarters of ART care in Kenya (NACC, 2008).

In the milieu of instability in Kenya, people fled their homes and health care services were disrupted due to staffing problems, lack of access to services and lack of transportation of supplies and personnel. During that time, it is not clear, what proportion of patients had continued their ART, were unable to obtain their medications, had left areas where they were receiving ART, had sought and received treatment elsewhere or what factors could be associated with non-adherence during this period (UN-IRIN, 2008b).

1.3 Justification

Kenya has been a leader in rapidly expanding access to HIV prevention, care and treatment to its citizens, and great efforts have been invested in developing national to facility-level systems to deliver prevention, care and treatment services for HIV infection and related diseases, including tuberculosis (TB) (US-PEPFAR, 2005).

The post-election violence has had effects on the different domains of health system, especially HIV/AIDS, the extent of which is has yet to be determined. There is no data on the propotion of HIV patients who had been on treatment and were affected by the violence and the effects of the violence especially on care and treatment services in the areas affected.

There is need for accurate and reliable data on the effects of the post-election violence on essential health services such as HIV patients care and treatment in order to mitigate the effects and to potentially develop systems with increased resiliency to future crises, be they man-made or natural. This study is part of a broader study to assess health care systems and delivery in the post-election violence period in Central, Nyanza and Rift Valley province and neighbouring IDP camps by the Ministry of Health in collaboration with the Centres for Disease Control and Prevention (CDC). The study assessed access and use of services for HIV and other chronic conditions like TB, Hypertension and Diabetes Mellitus and gave recommendations in event of future crisis. Quantitative and Qualitative methods were used in the broader study.

1.4 Objectives

1.4.1 General objective:

To determine the effects of post-election violence on HIV patients care and treatment in selected districts within Central, Nyanza, and Rift Valley provinces, Kenya.

1.4.2 Specific objectives:

- To determine HIV patients care and treatment access by patients during post-election violence in Central, Nyanza, and Rift Valley provinces, Kenya
- To determine utilization of HIV patients care and treatment services by patients during post-election violence in Central, Nyanza, and Rift Valley provinces, Kenya

1.5 Null Hypothesis

The post-election violence did not disrupt HIV patients care and treatment services in Central, Rift Valley and Nyanza Provinces of Kenya.

1.6 Alternate Hypothesis

The post-election violence disrupted HIV patients' care and treatment services in Central, Rift Valley and Nyanza Provinces of Kenya

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Clinical history of HIV

The Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome (HIV/AIDS) is the most devastating disease to ever face humankind. AIDS was first described in 1981 among homosexual men in North America (CDC, 2001). AIDS is caused by HIV which was first discovered in Paris in 1983 by a French scientist Luc Montagnier (Brown, 1991). HIV belongs to the lentivirus group of the retrovirus family. There are at least two types, HIV-1 and HIV-2. HIV-2 is almost entirely confined to West Africa although there is evidence of spread to the Indian subcontinent. Retroviruses are characterized by the presence of the enzyme reverse transcriptase, which allows viral ribonucleic acid (RNA) to be transcribed to deoxyribonucleic acid (DNA), and therefore incorporated into the host cell genome. The recombination of viral material generates different circulating recombinant forms (CRFs) which increases the genetic diversity that may be encountered (Kumar & Clark, 2002).

The interaction between HIV and the host immune system is the basis of pathogenesis of HIV disease. HIV primarily infects vital cells in the human immune system that have the CD4 molecule such as helper T cells, macrophages, and dendritic cells. HIV infection leads to depletion of these

cells, if the cell numbers decline below a critical level, cell-mediated immunity is weakened, and the body becomes progressively more susceptible to opportunistic infections. The spectrum of illness associated with HIV infection is broad and is the result of both direct HIV effects and the associated immune dysfunction (Kumar & Clark, 2002). HIV/AIDS is a syndrome consisting of various signs and symptoms. Several classification systems exist, and the WHO has classified AIDS into four clinical stages.

Clinical stage 1 is mainly asymptomatic and is characterized by persistent generalized lymphadenopathy. Clinical stage 2 is characterized by moderate unexplained weight loss, recurrent respiratory tract infections, herpes zoster, angular cheilitis, recurrent oral ulceration, papular pruritic eruptions, seborrhoeic dermatitis and fungal nail infections.

Clinical stage 3 usually presents with unexplained severe weight loss, unexplained chronic diarrhoea, unexplained persistent fever, persistent oral candidiasis, oral hairy leukoplakia, pulmonary tuberculosis, severe bacterial infections, acute necrotizing ulcerative stomatitis, gingivitis or periodontitis, unexplained anemia, neutropenia, or chronic thrombocytopenia. Clinical stage 4 presents with AIDS-defining signs and symptoms that include; HIV wasting syndrome, pneumocystis pneumonia, recurrent severe bacterial pneumonia, chronic herpes simplex infection, oesophageal candidiasis, extrapulmonary tuberculosis, Kaposi’s sarcoma, cytomegalovirus infection, central nervous system toxoplasmosis, HIV encephalopathy, extrapulmonary cryptococcosis, disseminated non-tuberculous mycobacterial infection, progressive multifocal leukoencephalopathy, chronic cryptosporidiosis, isosporiasis, disseminated

mycosis, recurrent non-typhoidal salmonella bacteraemia, lymphoma or other solid HIV-associated tumours, invasive cervical carcinoma, atypical disseminated leishmaniasis and symptomatic HIV-associated nephropathy or cardiomyopathy (WHO, 2007).

This clinical staging is used in deciding when to start HIV patients on ARV, especially in areas where CD4 testing is not possible, and to monitor progress of the disease and response to antiretroviral therapy (WHO, 2007). Eventually most HIV-infected individuals develop AIDS. Without treatment, about 9 out of every 10 persons with HIV will progress to AIDS after 10-15 years however many of the patients progress much sooner (Buchbinder *et al.*, 1994). Treatment with ARV increases the life expectancy of people infected with HIV. Even after HIV has progressed to diagnosable AIDS, the average survival time with ART is estimated to be more than 5 years (Schneider *et al.*, 2005). Without ART, death normally occurs within a year (Morgan *et al.*, 2002). It is hoped that current and future treatments may allow HIV-infected individuals to achieve a life expectancy approaching that of the general public.

2.2 HIV diagnosis, care and treatment

HIV infection is diagnosed either by the detection of virus-specific antibodies or by direct identification of viral material. Testing consists of rapid HIV tests, enzyme-linked immunosorbent assay (ELISA), Western blot and immunofluorescence assay (IFA).

Decades after the discovery of HIV, there is still no cure to the illness available. The aim of HIV management is to maintain physical and mental

health, avoid transmission of the virus and provide quality life. HIV infection is complex and management is best done with a multi-displinary team approach (Kumar & Clark, 2002).

ARVs prevent the virus from replicating by interrupting the HIV lifecycle. Different classes of HIV drugs target different stages of the virus. There are currently four approved classes of HIV drugs:

Entry Inhibitors: These drugs inhibit HIV from entering a host cell. There are different types of entry inhibitors including chemokine blockers and fusion inhibitors. Entry inhibitors are the newest HIV drug class. There is currently just one fusion inhibitor in use, enfuvirtide, or T-20, but researchers are studying many others.

Reverse Transcriptase Inhibitors: These drugs inhibit the action of reverse transcriptase enzyme and block HIV replication. Reverse transcriptase inhibitors are the oldest class of HIV drugs. There are three different types of drugs in this class:

1. Nucleoside Reverse Transcriptase Inhibitors (NRTIs) include Zidovudine (AZT), Didanosine (ddI), Zalcitabine (ddC), Stavudine (d4T), Lamivudine (3TC), Abacavir (ABC), Combivir (AZT plus 3TC).

2. Nucleotide Reverse Transcriptase Inhibitors. There is only one approved nucleotide drug, Tenofovir.

3. Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs) include Nevirapine, Delavirdine, and Efavirenz.

Integrase Inhibitors: These drugs inhibit the action of HIV's integrase enzyme hence preventing HIV from inserting its own genetic material into the host cell.

Currently there are no approved integrase inhibitor drugs, but several experimental ones are being studied.

Protease Inhibitors (PIs): These drugs inhibit the action of HIV's protease enzyme. Protease works to cleave the larger protein molecule for final assembly into virus. There are several protease inhibitors in the market, including Amprenavir, Indinavir, Saquinavir, Nelfinavir, Ritonavir, Kaletra, (a combination of lopinavir and ritonavir), Atazanavir, Fosamprenavir calcium, and Darunavir

Assembly and budding inhibitors: These experimental HIV drugs are designed to interfere with the final steps of assembly of new virus particles. They also prevent the budding of the new viruses out of the CD4 cell. There are no drugs of this type yet, but several candidates are under clinical investigation.

The treatment of HIV-infected individuals has evolved substantially during the years of the AIDS epidemic. Previously, potent drugs that could induce prolonged and near-complete suppression of viral load gave hope to patients for a longer, healthier life and clinicians sought maximum effects of treatment by initiating potent drugs early in the disease. As experience with HIV infection and highly active antiretroviral therapy (HAART) increased, the focus began to include tolerability and convenience with a view to minimizing the adverse effects of therapy and maximizing adherence. Currently, a rational combination of these two approaches, known as "total patient health" is emerging. This approach balances the durable suppression of viral load and

attaining immunologic benefits against potential drawbacks of therapy, including complexity of regimen, adverse effects, and lack of adherence (Tindyebwa *et al.*, 2004).

2.3 Factors influencing HIV patients care and treatment

Successful therapy depends on frequent monitoring and adherence to medication. In the absence of viral load testing for detecting early ART failure, adherence is even more crucial for delaying or avoiding the development of drug resistance and ensuring maximum durability of the first-line ARV regimen (WHO, 2006a).

2.3.1 ARV Adherence

Compliance is very difficult due to life long continuation of ART. Some studies have shown that adherence to treatment is erratic in a large percentage of people and for the maximum benefits of ART to be achieved, adherence has to exceed 95% (Kumar & Clark, 2002).

Using ARV drugs together in potent combinations has helped many people control HIV and live longer and healthier lives. However, the ARV drugs can produce adverse effects. They also have complicated dosing schedules and food restrictions. This can make adherence very difficult for many people. Other factors that have been associated with lack of adherence and barriers to accessing treatment include: busy lifestyle, lack of disclosure of HIV status to work colleagues, friends, lovers, or family, depression, other life stresses, such as childcare or parenting issues, active drug and substance use, cultural beliefs, homelessness and imprisonment (Ramadhan *et al.*, 2007).

Adherence to HIV medication is important. ARVs need to be in the blood at certain levels to be effective. Dosing schedules are designed to maximize these levels. By not taking medicine on schedule, patients are at risk of allowing drug levels to drop. This may allow HIV to replicate and even have mutations. These mutations can help the virus survive, even in the presence of ARV medication leading to drug resistance.

2.3.2 Drug resistance

After infecting a CD4 cell, HIV replicates and infects other cells. This process happens rapidly – HIV can make up to 10 billion new viruses every day. During reproduction, HIV must copy its genetic information. Copying happens so fast that mistakes are made leading to random mutations (Clave & Hance, 2004).

Some mutations result in subtypes that are less virulent, but other mutations are responsible for drug resistance. If a drug does not work against a mutated virus, the virus will rapidly replicate leading to increased viral load and treatment failure. Mono-therapy and bi-therapy as well as planned or unplanned treatment and drug supply interruptions can accelerate the process of development of drug resistance (Paterson *et al.*, 2000; WHO, 2006a).

Resistance to certain classes of HIV drugs develops more easily than resistance to other classes. HIV only needs one particular mutation to become resistant to all the NNRTIs (cross-resistance). Resistance to other classes, such as protease inhibitors (PIs), is more difficult to develop. Two or more mutations are required before resistance to PIs occur (Clave & Hance, 2004).

Studies have shown that 12% of people who are newly infected with HIV get a strain that is already resistant to one drug and 6% of patients get a strain resistant to two or more drugs. This means that newly-infected people, who have never taken any drugs, may already have a limited selection of HIV treatment options due to resistance acquired. HIV positive people who have already received HIV therapy are even more likely to have resistant virus (WHO, 2007).

Several tests are available to test for drug resistance and include; Genotype test which uses HIV from the patient blood to check the genetic sequence of the virus for mutations associated with drug resistance, and Phenotype test which challenges the patients' virus with all HIV drugs (in a test tube) to determine which ones are still effective against HIV (Hirsch *et al*., 2000). Resistance tests are helpful when choosing a new regimen. The tests should only be used as a guide. Other factors, such as past medications, side effects, and adherence must be taken into account.

The best way to avoid drug resistance in HIV infection is to enhance adherence. Any factors that lead to the ineffective delivery of ARV could increase HIV drug resistance, leading to an increase in therapeutic failures and transmission of resistant virus, a decrease in therapeutic options and the effectiveness of survival and treatment programmes (WHO, 2006b).

2.4 HIV in Kenya

Since the discovery of the first case of AIDS in 1981, the pandemic has spread in the populations of many countries in sub-Saharan Africa and is a major public health problem. As in other African countries, the HIV/AIDS pandemic has affected a significant number of Kenyans. The first case of HIV in Kenya was described in 1984 and currently 1.3-1.4 million Kenyans are living with HIV (UNAIDS, 2006; NASCOP, 2008). Overall HIV prevalence among 15-40 year olds has increased from 6% in 2003 to 7.4% in 2007 and the prevalence among males and females has remained the same with more females being infected with HIV than males (CBS, 2004; NACC, 2005a; NASCOP, 2008). HIV infection occurs at all ages but there are differences in the burden of infection in different ages. In Kenya, among persons aged less than 35 years, the burden of disease is statistically higher among females but above 35 years the ratio of male to female is almost 1 to 1 (NASCOP, 2008).

Geographically, the prevalence of HIV in Kenya has not changed since 2003 in the different provinces in Kenya with Nyanza having the highest prevalence (15.3%) and North eastern having the lowest prevalence (1%) in 2007 (Figure 1) (CBS, 2004; NASCOP, 2008)

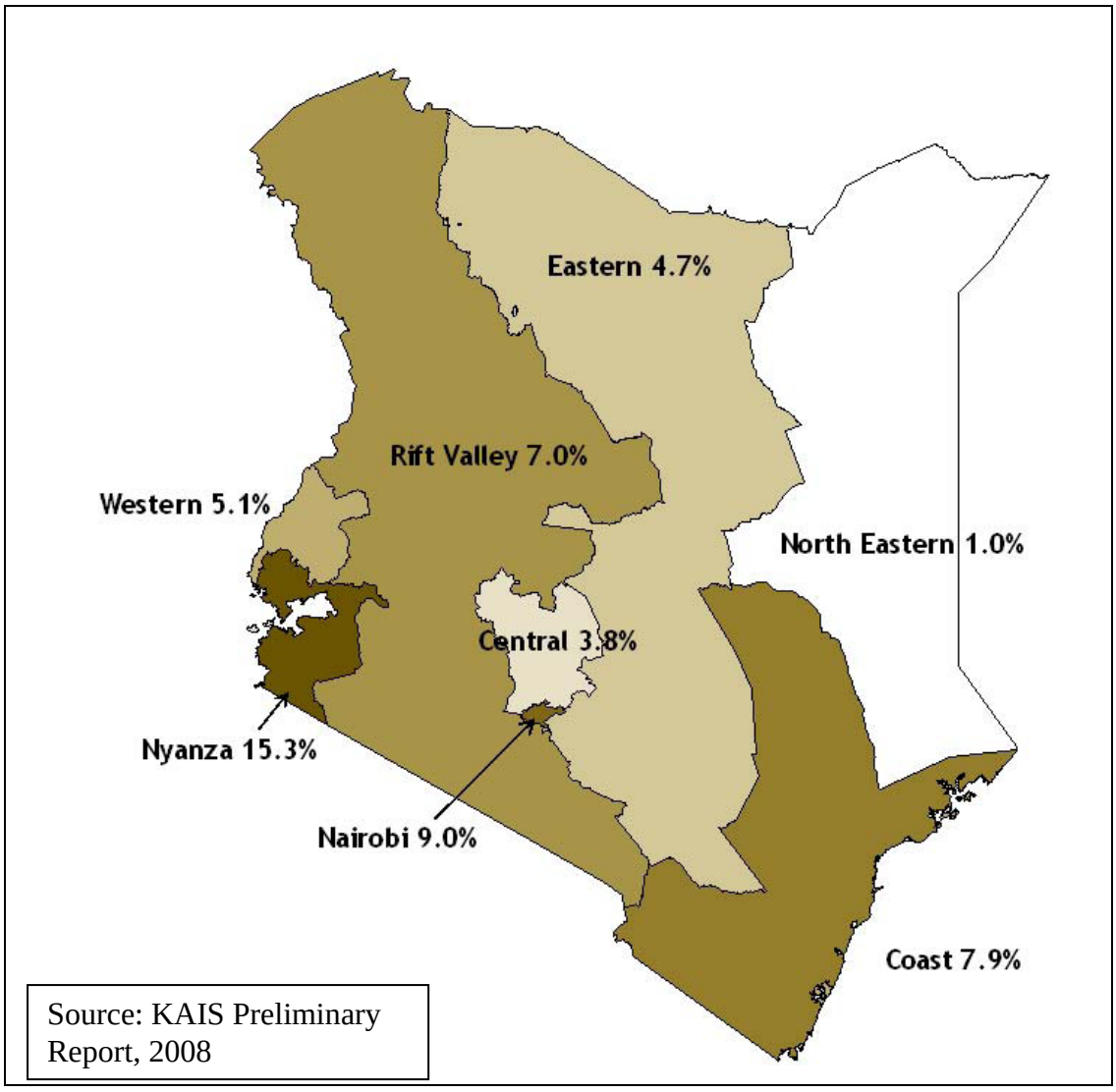

Figure 1: HIV prevalence in Kenya by Province (KAIS 2007).

Marital status has been shown to have an association with higher HIV prevalence in Kenya, especially among widowed women and men in polygamous marriages. Previously, having sex outside of marital relationships has been considered "high risk" sex, however, among married individuals who

are HIV positive, 45% have a HIV negative partner and this puts this negative partner at greater risk of HIV infection (NASCOP, 2008).

In 1997, the Kenya government established policy guidelines to help in the management of HIV. By 1999, Kenya was among the African countries hardest hit by HIV and HIV/AIDS was declared a national disaster. The National AIDS Control Council (NACC) was formed to coordinate HIV/AIDS activities in the country (UNAIDS, 2001; Muga *et al.*, 2005).

The NACC proposed various interventions to help combat HIV in Kenya. They included; interventions for preventing the transmission of HIV such as promoting abstinence before marriage and faithfulness to one partner, promoting voluntary counseling and testing, promoting the use and availability of condoms, controlling other sexually transmitted diseases, preventing infection in young people, interventions to prevent mother-to-child transmission (PMCT) - Preventing HIV infection in women, comprehensive antenatal care and nutrition during pregnancy, counseling and testing, antiretroviral therapy, reducing transmission during childbirth, reducing transmission from breastfeeding, reducing the number of HIV-exposed pregnancies and safe blood supply; Care and treatment of HIV infection including antiretroviral treatment and promotion of home-based care; Vaccines studies (NACC, 2008).

Each of the interventions described above make an important contribution to controlling the spread of HIV but alone, none will be as effective, thus the importance of the use of combined interventions (MOH, 2008a; NACC, 2008).

Different countries have adopted guidelines for ART provision to suit the individual countries. According to the Kenyan ART guidelines of 2006, the recommended first line treatment for adults is;

Lamivudine (3TC) + Zidovudine (AZT) + Efavirenz (EFV) or Nevirapine (NVP)

Or

Lamivudine (3TC) + Stavudine (D4T) + Efavirenz (EFV) or Nevirapine (NVP)

The second line regime is;

Abacavir (ABC) + Didanosine (DDI) + Lopinavir/Ritonavir (LPV/r)

Or

Abacavir (ABC) + Tenofovir (TDF) + Lopinavir/Ritonavir (LPV/r)

HIV positive patients are predisposed to frequent opportunistic infections and hence the national guidelines advocate for provision of Cotrimoxazole (CTX) for all HIV positive patients unless contraindication is present. This recommendation is in line with the revised WHO guidelines on CTX prophylaxis in Africa (NASCOP, 2005).

ART delivery to patients in Kenya began in 2000. In early 2005, ART was provided in 52% of hospitals and 12 % of health centers and 36,000 people were on ART. The government had planned to increase the number of patients on ART to 50% in 2005 and 75% in 2008 (MOH, 2005b; NACC, 2005a). Most of the facilities providing ART in Kenya are either Non-Governmental Organizations or Faith Based organizations (Muga *et al.,* 2005; MOH, 2003).

By November 2007, approximately 180,000 patients had been started or were being maintained on ART through the Kenya Ministry of Health (MOH), PEPFAR's Global AIDS Program (GAP) supported programs.

2.5 Effects of disasters on Health Care

Natural disasters such as earthquakes, hurricanes, Tsunamis as well as man made disasters such as political violence and ethnic conflicts have varied effects on health care systems and service delivery. After the Tsunami in Indonesia in 2004, and during the period following hurricane Katrina in the United States in 2005, studies showed the need for disaster management and organized rapid response teams for emergencies (Bhayana, 2007; Druss *et al.*, 2007).

In August 2005, a powerful Category 4 hurricane swept through the coasts of Mississippi and Louisiana in the United States of America., causing extensive devastation and deaths. Many people were displaced from their homes and many more required medical attention. Some of the hospitals in the region were damaged and the ones that had survived had to cope with the increased patient load. Staffing was a major challenge with the few staff present forced to work extra hours with no relief even after suffering personal losses (Babar & Rinker, 2006)

Complex political emergencies have a direct impact on health. They impair functioning of health systems through destruction of infrastructure (Zwi *et al.*, 2002). For example in Hurricane Katrina there was a break-down in communication due to loss of landline and cellular phones after the storm. To

compound this, there was complete loss of power supply and alternative means of power supply had to be sought. Fuel was also a major factor and contributed to staff inability to get to work (Babar & Rinker, 2006)

Other challenges faced in complex disasters include increase in number of patients at the emergency department, reduced access to medicines, reduced space and capacity to store bodies and weakened national capacity for health policy-making (Zwi *et al.*, 2002). Additional challenges faced by neighbouring countries that displaced people relocate to include increased risk of infectious and vaccine preventable disease. The control and prevention progress made by health system in these counties is undermined (Suwanvanichkij, 2008).

Even after a given disaster, there is need to strengthen the systems to ensure that the gains made before the disaster are maintained, especially in countries where the health indicators were a cause for concern before the disaster (Carballo *et al.*, 2005).

Armed conflicts have profound effects on HIV, especially in Sub Saharan Africa which bears the world's highest burden of HIV (USIP, 2001;UNAIDS, 2006). Areas experiencing chronic conflict such as the Democratic Republic of the Congo and Churachandpur District, India have shown the need to tailor HIV and TB care and treatment to the situation at hand (Culbert et *al.*, 2007; Rodger *et al.*, 2002).

An emergency preparedness and response plan should always be present. An integrated and coordinated approach is important, but even the best laid plans

can fall through and so a contingency plan should also exist (Babar & Rinker, 2006; Druss *et al.*, 2007; Spiegel *et al.*, 2007; Somasundaram, 2008).

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study Site

Of the five provinces most affected by the post-election violence, three provinces (Central, Nyanza, Rift Valley) had varied post-election violence experience and in addition receive over three quarters of the ART care in Kenya before the post-election violence (NACC, 2008). A total of 35 health facilities from 18 districts in Central, Nyanza, Rift Valley provinces in Kenya were sampled The health care facilities were first selected and the facilities with more ART clients had a higher likelihood of being selected. The randomly selected health facilities were thus in the 18 different districts across the three provinces.

Central Province covers the area around Nyeri to southwest of Mt. Kenya. The provincial capital is Nyeri. According to the 1999 National census, Central province had a total population of 3,724,159 inhabitants for an area of 13,191 km^2 . The randomly selected districts within Central province included: Kiambu, Kirinyaga, Muranga, Nyandarua, Nyeri and Thika.

Nyanza Province covers the area around Lake Victoria. It is in the southwest corner of Kenya. The provincial capital is Kisumu, the third largest city in Kenya. The province has a population of 4,392,196 individuals (as of 1999) within an area of 16,162 km^2 . The districts selected included: Gucha, Kisumu, Nyamira, Rachuonyo, Siaya and Suba.

Rift Valley Province borders Uganda and is dominated by the Great Rift Valley which passes through it and gives the province its name. The capital is the town of Nakuru. The province covers an area of 173,854 km² for a population of 6,987,036 inhabitants, being the largest and most populated province in the country in the 1999 census. The districts selected included: Kericho, Keiyo, Laikipia, Nakuru, Nandi North, and Uasin Gishu.

3.2 Study Design

A cross-sectional study was conducted to determine the effects of post-election violence on HIV patients care and treatment in selected districts in Central, Nyanza, and Rift Valley Provinces, Kenya. A cross-sectional study design was selected because it is valuable in assessing the health care needs of a population and provides prevalence estimates of the factors measured. It can also be conducted rapidly to get timely information for necessary public health intervention in health emergencies.

3.3 Study Population

The study population was HIV positive patients receiving services from the selected health facilities in the 3 provinces. Central province has a HIV prevalence of 3.8% and a total of 21,962 patients on ART therapy. In Nyanza province the HIV prevalence is 15.3% with 41,292 HIV positive patients on ART therapy. Rift Valley province has a HIV prevalence of 7% and 33,594 HIV positive patients receiving ART.

Participants were eligible for participation in the survey if they met the following criteria:

- Participant aged 15 years and above who presented to the HIV clinic for services on the day of data collection.
- Informed consent from participant or guardian for participants below 18 years.

3.4 Sample Size Determination and Selection

The sampling frame used was a list from the PEPFAR Partner Reporting Collation Sheets, (2007) of ARV-providers. The list contains 230 such facilities along with numbers of patients on treatment, partner affiliation, and type of facility (mission, government, or private), district, and province. Using SAS 9.1 program, health care facilities were randomly selected by Probability Proportional to Size (PPS). PPS was used because it allows for equal opportunity of selection for each ART patient. The chance of a facility being selected was proportional to the number of ART patients it served; hence the facilities with a higher number of patients had a higher probability of selection. Thirty five facilities in eighteen districts from each of the three Provinces, Central, Nyanza, and Rift Valley province were thus selected. This was the first stage of sampling.

The formula by Henderson *et al.,* (1982) was used to calculate the sample size of a cluster sample;

$$\mathbf{n= [Z^2 * P (q)/d^2]*g}$$

Where:

n= the sample size needed.

z= 1.96 at 95% confidence interval

p = the proportion estimate to be found in the target population (0.5)

q= 1 – p (0.5)

d = the width of the confidence interval chosen (±5%)

g= design effect (2)

A non-respondent rate of 10% was added.

The calculated sample size was 845 participants.

The proportion of HIV infected patients who could not access health services was assumed as 50% as it was not know at the time of the study how many people had been unable to access the health services due to the Post-election violence.

The design effect varies when using cluster sampling and I adopted a design effect of 2 which is usually estimated as the design effect in immunization cluster surveys (Henderson *et al.,* 1982).

The second stage of sampling was done at the health facility. After a random start, 30-50 consecutive patients attending the facility HIV clinic on the day of the assessment were asked to participate in the study.

3.5 Data Collection Tools

A pre-tested semi-structured questionnaire (Appendix 6) was administered to the participants. The questionnaire included November- December 2007 as a baseline (pre-election period) and January- February 2008 as the study period (post- election period) looking at patient access to services in the post-election

period. Patient register review was done from January- February 2008 as the study period and compared with November- December 2007 as a baseline to assess for any changes in overall HIV services utilization. Registers were reviewed from departments including HIV ART clinic, pharmaceuticals, VCT, ANC and Labor ward (Appendix 7).

3.6 Data Collection

Data collection involved conducting interviews with selected participants and review of patient registers. After establishing the eligibility for enrolment, the study purpose, risks and benefits was explained and informed consent obtained from each and every participant. If the participant was a minor or was unable to give consent then the guardian provided informed consent on behalf of the participant.

Forty-four study interviewers underwent an intensive 3-day training process to ensure consistency in data collection before the field process. The training involved;

- Background information on HIV and ART
- Enrolment procedures for the study
- Informed consent process
- Data collection tools
- Interview techniques

Pre-testing of the questionnaire was done at Mbagathi District Hospital before the study was commenced.

The trained interviewers collected information from a semi-structured questionnaire and the register review form and cross checking of the questionnaire was done after each interview was completed.

3.7 Data Management and Analysis

Data was analyzed using Epi-Info 3.4.3 and SAS 9.1 statistical software. Descriptive analysis of various socio-demographic characteristics was carried out. From the number of days of therapy missed per patient per month, patient-days of therapy missed was calculated and summed up by month and reported by province. A rate of missed patient-days per 1000 patient-days also was calculated. Univariate analysis of factors that were thought to influence missing ART treatment among the study subjects was also done. Control of confounding during analysis was done using logistic regression. All factors with a p-value of 0.1 were entered into a logistic regression model and eliminated through backward elimination process.

Odds Ratio (OR) was used to assess the strength of association between various risk factors and missing ART. An OR of more than 1 was taken to be promotive while an OR of less than 1 was taken to be inhibitory. An OR of 1 indicated that there was no association between the factor and missing ART.

95% confidence interval was used to assess the variability and significance of the OR. A confidence interval of OR which included 1 was interpreted to be not significant.

Categorical variables were compared using Chi-Square test of statistical significance (or Fishers exact test if more than 20% of the cells have counts less than 5 and if any cell has expected count less than 1). Continuous variables

were compared using a Student T-test. Facility level data comparison was done by Wilcoxon signed rank test for the facilities that had complete data.

A variable with a p-value of <0.05 was taken to be statistically and significantly associated with missing ART. This was interpreted to mean that the likelihood of obtaining an observed association between missing ART and the factor by chance alone was less than 5%.

3.8 Ethical Considerations

No personal identifiers were collected during the assessment. Participants cannot be traceable or identifiable after data analysis is complete. There were no direct benefits to individuals who participated in the study. There were no risks for participating or any penalty for refusal to participate. Informed consent was given by the eligible participant or a responsible adult parent or guardian for participants below 18 years who were not emancipated (Appendix 1). There were no incentives or coercion to participate. The respondent was free to withdraw from the study if he or she changed his or her mind during the survey. Scientific and ethical approval from JKUAT as well as the Ministry of Education, Science and Technology (Appendix 4), and the Ministry of Health (Appendix 3) was sought and granted. Non-research determination was obtained from the Kenya Medical Research Institute (Appendix 2). Confidentiality was observed for any information obtained and information stored in password protected computers.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic characteristics of the patients interviewed

Nine hundred and forty seven patients were interviewed at selected facilities with ART clinics as shown in Table 1. In Central 293 (30.9%), Rift Valley 255 (26.9%) and Nyanza 399 (42.1%) provinces.

The median age of all the participants interviewed was 36 years (range 29 - 44 years). In Central province, the median age was 37 years while in Nyanza and Rift Valley it was 35 and 36 years respectively.

Majority of the respondents were female in all three provinces. Central province had 71.8%; Nyanza had 70.9% while Rift Valley had 74.2% participants.

Marital status of the participants showed, 525 (55%) of the sample population as married. Nyanza province had lower number of divorced/separated participants (4.3%) and higher number of widowed participants (27%) compared with the other provinces

Table 1: Demographic characteristics of participants per province

Characteristics	Central Province n=293	Nyanza Province n=399	RiftValley Province n=255
Age (years)			
-Median (range)	37 (31,44)	35 (29,44)	36 (30,43)
Gender			
-Male (%)	81 (28.2)	115 (29.1)	65 (25.8)
-Female (%)	206 (71.8)	280 (70.9)	187 (74.2)
Marital Status			
- Single (%)	46 (16.2)	45 (11.3)	33 (13)
- Married (%)	164 (56.6)	228 (57.4)	133 (51.6)
-Widowed (%)	39 (13.4)	107 (27)	57 (22.4)
-Divorced/separated (%)	40 (13.8)	17(4.3)	33(13)

A total of 940 (99%) participants indicated that they were on either ART or Trimethoprim/sulfamethoxazole ((co-trimoxazole: generic name) or both treatment regimens on the day of the interview (Figure 2). Seven patients (two in Central province and five in Nyanza provinces) were not on either treatment regiment. Central province (46%) had the highest participants on both treatment regimes while Rift Valley province had the highest participants on ART only.

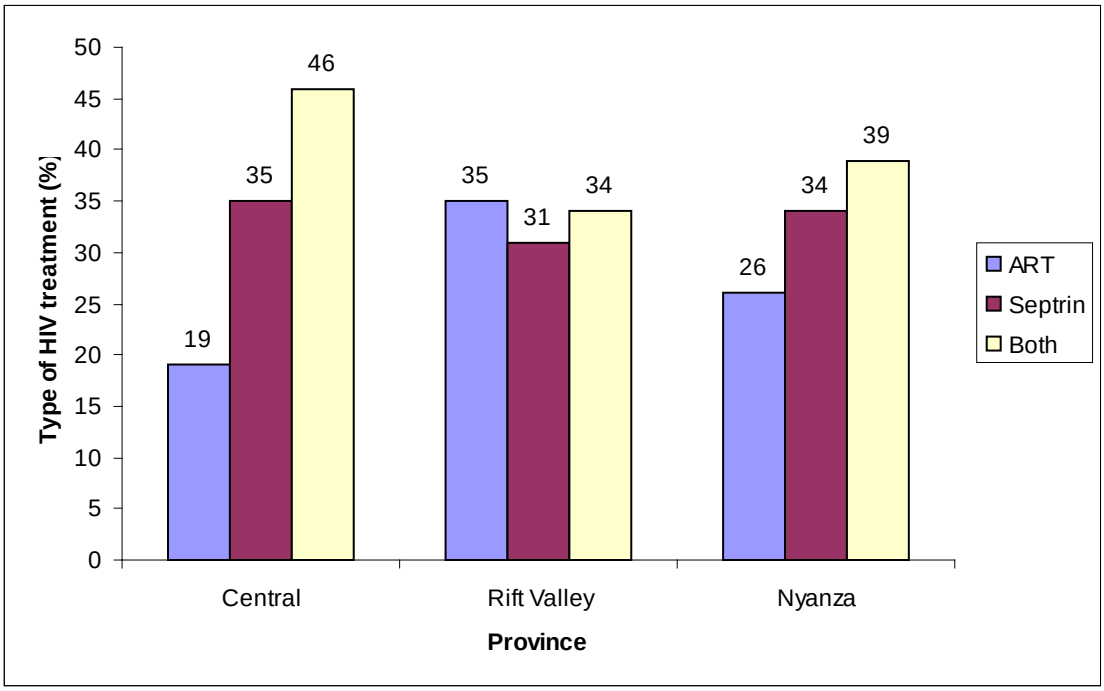

Figure 2: Type of HIV treatment administered per province

4.2 Access to care and treatment in the post-election violence period by Province

A total of 129 (13.6%) participants reported to have changed their district of stay in the post-election violence period (since December 30, 2007). Rift Valley province 52(40%) had the highest change while Central 35(27%) had the lowest change (Figure 3). This percentage difference between Central and Rift Valley was statistically significant with chi square p-value at <0.0001.

Among 8 reasons for moving into a new district, the most common reason was fear of personal or family violence (34%).

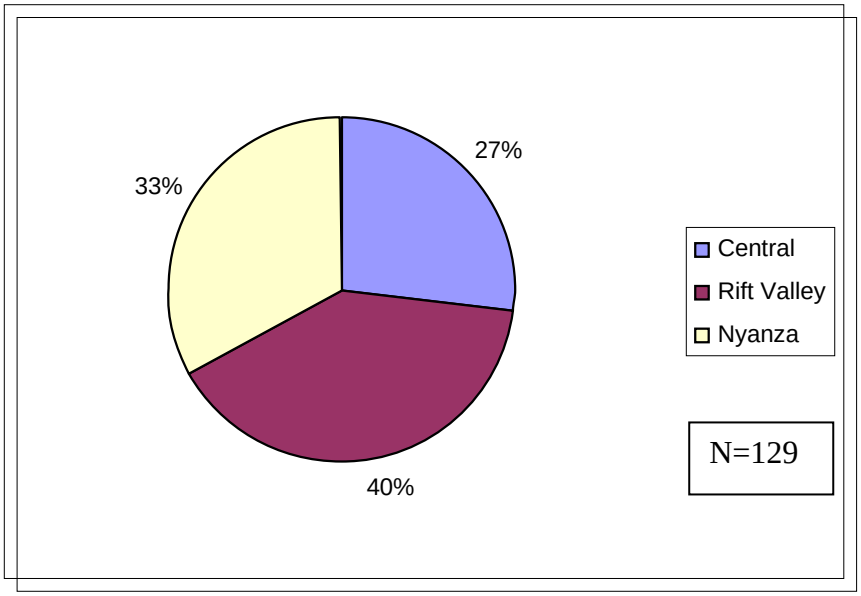

Figure 3: Participants who changed district of stay since December 30, 2007

In total, 71 (7.5%) participants reported not being at the clinic/facility where they normally seek health care on the day of the interview (Figure 4). Central 32 (45%) had the highest number, followed by Nyanza 27 (38%) and lastly Rift Valley 12 (17%).The percentage differences were statistically significant between Central and Rift Valley with chi square p-value at 0.0028.

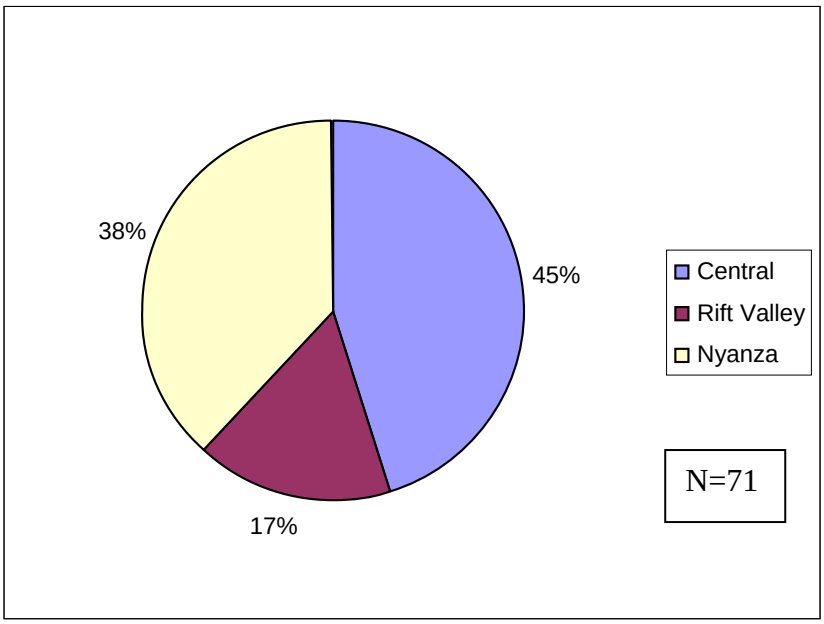

Figure 4: Participants who changed facility of healthcare per province

From nine choices given, the three most common reasons cited for changing facility of normal care in all three provinces were, having moved (42.7%), road(s) being blocked (13.3%), or usual clinic not providing the service (18.7%) (Table 2).

Table 2: Participants reasons for changing facility of normal care

Factor	frequency	percentage
Moved	32	42.7
Afraid to go to the Facility	3	4
Road Block	10	13.3
Cannot Afford	4	5.3
Clinic not functioning	4	5.3
Afraid to travel	2	2.7
Lack of transportation	4	5.3
Available but denied healthcare	2	2.7
Usual clinic did not provide service I need	14	18.7

When asked if there was a period since December 30, 2007, when they were not able to access medical care that they needed, 212 (22%) from the 947 participants said yes. Nyanza province had 103 (49%) while Central province had 33 (16%). These percentage differences between the three provinces were statistically significant with chi square p-value at <0.0001.

The four most common reasons for inability to access care in the three provinces were, the clinic was not functioning (29.7%), road blocks (24.8%), the participants were afraid to travel (17.9%) and participants were unable to afford it (10.9%), (Table 3).

Table 3: Participants reasons for not accessing routine care

Factor	frequency	percentage
Moved	12	3.6
Afraid to go to the Facility	22	6.6
Road Block	82	24.8
Cannot Afford	36	10.9
Clinic not functioning	98	29.7
Afraid to travel	58	17.6
Lack of transportation	1	0.3
Available but denied healthcare	12	3.6
Usual clinic did not provide service I need	9	2.7

Out of 119 (12.5%) participants who felt ill and did not get medical care, 16.8% were in Central province, 42.9% in Rift Valley province and 40.3%

from Nyanza province. The difference between the provinces was statistically significant with chi square p-value at <0.0001.

The 3 most common reasons for not getting care when needed in all three provinces were, clinic not functioning (25.2%), road blocks (23.9%) and the participants were afraid to travel (15.9%).

4.3 Missing treatment among the study participants

The study provided evidence of increased HIV medication (ART and co-trimoxazole) interruptions associated with the post-election violence period. Data were largely consistent between the numbers of patients missing doses (Table 4). More participants reported that they had missed one or more doses of ART in January 2008 (64) than in November 2007 (14); the differences were statistically significant in Rift Valley (p<0.0001) and Nyanza (p<0.0001) provinces.

Table 4: Participants who reported missing ART by province, Kenya, 2007

Months	**Central Province**	**Rift Valley Province**	**Nyanza Province**
	Patients Missed N=188 (%)	**Patients Missed N= 177(%)**	**Patients missed N= 259 (%)**
November 2007	7 (3.7)	3 (1.7)	4 (1.5)
December 2007	5 (2.7)	13 (7.3)	18 (6.9)
January 2008	9 (4.8)	31 (17.6)	24 (9.3)
February 2008	5 (3.7)	12 (6.9)	8 (3.1)
Comparing Nov with Jan	**p=0.75**	**p<0.0001**	**p<0.0001**
Comparing Nov with Feb	**p=0.82**	**p<0.0001**	**P=0.34**

Similarly, differences were also seen when patients were asked to quantify the number of days they missed therapy. A rate (therapy-days missed per 1,000 therapy days per month) was calculated to enable comparison of the different months that the patients reported missing treatment. In January compared with November in Rift valley ($p<0.0001$) and Nyanza ($p<0.0001$) the rate of missing therapy was significantly different in the two months. Only in Rift Valley province ($p<0.0001$) were the increased rates of treatment non-adherence reported in January sustained into February (Table 5).

Table 5: The number of therapy-days missed per 1,000 therapy-days per month by province, Kenya, 2007

Months	**Central Province**	**Rift Valley Province**	**Nyanza Province**
	Therapy-days missed per 1,000	**Therapy-days missed per 1,000**	**Therapy-days missed per 1,000**
November 2007	32.3	14.1	9.6
December 2007	15.3	34.4	39.2
January 2008	28.9	83.6	42.9
February 2008	29.9	62.1	12.4
Comparing Nov with Jan	**p=0.15**	**p<0.0001**	**p<0.0001**
Comparing Nov with Feb	**p=1.00**	**p<0.0001**	**p=0.012**

For participants who missed CTX prophylaxis, the differences were statistically significant in Rift Valley in January ($p=0.0002$) and February ($p=0.0014$) as compared to the month on November (Table 6).

Table 6: Participants who reported missing CTX by province, Kenya, 2007

Months	Central Province	Rift Valley Province	Nyanza Province
	Patients Missed N= 237 (%)	**Patients Missed N=165 (%)**	**Patients missed N= 290 (%)**
November 2007	9 (3.9)	7 (3.7)	9 (2.9)
December 2007	5 (2.2)	18 (9.5)	19 (6.2)
January 2008	13 (5.6)	31 (16.1)	23 (7.4)
February 2008	10 (4.4)	20 (9.9)	19 (6.0)
Compared Nov with Jan	**p=0.34**	**p=0.0002**	**p=0.07**
Compared Nov with Feb	**p=0.62**	**p=0.0014**	**p=0.39**

Similarly, differences were also seen in therapy-days missed per 1,000 therapy-days per month in January ($p<0.0001$) and February ($p<0.0001$) were statistically significant in both Rift Valley and Nyanza provinces when compared to November 2007 (Table 7). This shows a significant increase in the number of days that patients missed treatment in the months of January and February 2008.

Table 7: The number of therapy-days missed per 1,000 therapy-days per month by province, Kenya, 2007

Months	Central Province	Rift Valley Province	Nyanza Province
	Therapy-days missed per 1,000	Therapy-days missed per 1,000	Therapy-days missed per 1,000
November 2007	26.9	30.7	29.2
December 2007	17.9	71.5	43.6
January 2008	35.9	101.6	46.7
February 2008	31.3	85.4	36.3
Compared Nov with Jan	**p=0.008**	**p<0.0001**	**p<0.0001**
Compared Nov with Feb	**p=0.40**	**p<0.0001**	**p<0.0001**

4.4 Potential Risk factors for non-adherence to ART therapy

Table 8 details the results of univariate analysis of possible risk factors influencing missing ART therapy. The table illustrates Odds Ratios (OR), 95% confidence intervals of OR and significance using chi square of risk factors that may be responsible for or influence Missing ART therapy during the Post-election violence period (January 2008- February 2008).

Table 8: Analysis of factors that influence ART non-adherence in post-election violence period

Factors	OR	95% CI	P-value
1. Age (median)	1.02	0.998-1.033	0.0836
2. Female	0.7	0.4-1.2	0.22
3. Moved*	2.6	1.4-4.7	0.002
4. Unable to access routine health care*	9.5	5.4-16.6	<0.0001
5. Normal hospital of care*	0.3	0.15-0.66	0.002
6. Felt ill but didn't access care*	9.1	5.2-15.9	<0.001
7. Experienced physical violence on self*	2.7	1.3-5.5	0.0055
8. Family member harmed by violence	1.5	0.9-2.5	0.148
9. Witnessed physical violence*	2.0	1.1-3.5	0.02

* Variables with p-value < 0.05

Out of several factors that were analyzed as possible risk factors for missing ART during the post-election violence period, six turned out to be significant at p-value of <0.05 as shown in Table 8. Participants who reported to have moved districts since December 30, 2007, were more likely to miss ART (OR= 2.6, p=0.002). Similarly, those who reported to have been unable to access health care during the post-election violence period (OR= 9.5, p<0.0001) and fell ill but were unable to access medical care (OR= 9.1, p<0.0001) were also more likely to miss medication. Having experienced physical violence personally (OR= 2.7, p=0.0055) or having witnesses acts of physical violence (OR= 2.0, p=0.02) were also significant factors. Participants who were at the

hospital of normal care on the day of the interview were less likely to miss ART (OR= 0.3, p=0.002).

Upon subjecting the statistically significant factors to a logistic regression model only 2 factors remained independent. Inability to access routine health care (OR= 5.25, p<0.0001) and inability to access health care when ill (OR= 3.81, p<0.0001) were significantly associated with missing ART therapy in the post-election violence period (Table 9).

Table 9: Significant predictors for ART adherence in Post-election Period

Factor	**Odds Ratio**	**95% C.I.**	**P-Value**
Unable to access routine health care	5.25	3.03-8.34	<0.0001
Felt ill but didn't access care	3.81	2.42-6.02	<0.0001

Out of nine factors that were analyzed as possible risk factors for missing CTX during the post-election violence period, four were significant at p-value of <0.05 as shown in Table 10 Participants who reported to have moved districts since December 30, 2007 were more likely to miss CTX (OR= 1.91, p=0.0019). Similarly, those who reported to have been unable to access health care during the post-election period (OR= 6.3, p<0.0001) and felt ill but were

unable to access health care (OR= 6.1, p<0.0001) were also more likely to miss medication. Participants who were at the hospital of normal care on the day of the interview were less likely to miss CTX (OR= 0.43, p=0.014).

Table 10: Analysis of factors that influence CTX adherence Post-election period

Factors	OR	95% CI	P-value
1. Age (median)	0.99	0.97-1.01	0.45
2. Gender	1.29	0.77-2.19	0.33
3. Moved*	1.91	1.1-3.31	0.019
4. Unable to access routine health care*	6.43	4.02-10.31	<0.0001
5. Normal hospital of care*	0.43	0.22-0.84	0.014
6. Felt ill but didn't access care*	6.1	3.73-9.87	<0.001
7. Experienced physical violence on self	1.3	0.67-2.65	0.4
8. Family member harmed by violence	1.5	0.9-2.5	0.148
9. Witnessed physical violence	1.48	0.92-2.4	0.11

* Variables with P-value < 0.05

On logistic regression only two factors remained significant. Participants who felt ill but were unable to access health care (OR= 3.81, CI 2.41-6.02, p<0.0001) and those who had no access to routine health care (OR= 4.01, CI 2.7-5.88, p<0.0001) were more likely to miss CTX medication.

4.6 Utilization of services during the post-election violence period

Thirty-five health facilities were visited and registers in the HIV clinic reviewed for the months of January, February, November, December 2007 and January and February 2008.

In some of the facilities, we were unable to get complete data. Some facilities could not trace the data from the months in 2007, others had not been able to keep records during the post-election period due to shortage of staffs and in some facilities they did not use the ministry issued registers and thus some of variables data was not collected. In the HAART clinics, different facilities used different definitions for the variables for example; defaulters were recorded as those who missed 2 consecutive appointments in some clinics or those who missed any clinic appointment in other clinics.

Analysis was done only on the facilities that had data for the months of November 2007, January 2008 and February 2008. The difference between the month of November 2007 and January/ February 2008 was use to rank the facilities and median used to test for significance using Wilcoxson sign rank test. A negative median shows that the patient load was lower in the months of January/ February 2008 as compared to November 2007 (Appendix 5).

For HIV counseling and testing, there was significant decline in the numbers of pregnant women tested in the labour ward and in persons receiving Voluntary Counseling and Testing (VCT) in January 2008 compared with November 2007 (Table 11), in Rift Valley (for 8 of 8 facilities, p=0.01 and for 10 of 10 facilities, p=0.002, respectively) and Nyanza Provinces (for 8 of 9 facilities, p=0.04 and for 9 of 10 facilities, p=0.02, respectively). In Rift Valley (for 6 of

8 facilities, p=0.04 and for 7 of 9 facilities, p=0.03, respectively), decreased levels of both kinds of testing continued in February 2008. In Nyanza Province, the decreased rates of testing in the labour ward continued in February 2008 (for 7 of 9 facilities, p=0.02) while VCT service delivery was not significantly different from the comparator period. No significant changes in HIV testing utilization were observed in Central Province. For HIV testing in antenatal clinics, no significant differences from the comparator period were seen in any of the three provinces.

Table 11: HIV testing from clinical register counts comparing November 2007 with January and February of 2008 by province

	Central Province		**Rift Valley Province**		**Nyanza Province**	
	Jan 08 median	Feb 08 median	Jan 08 median	Feb 08 median	Jan 08 median	Feb 08 median
VCT	2 p=1	-4 p=0.22	-130.5 p=0.002	-105 p=0.027	-39 p=0.02	-24 p=0.13
Labour ward	2 p=0.62	2 p=0.69	-13.5 p=0.01	-18.5 p=0.04	-16 p=0.04	-11 p=0.02

The HIV clinic data did not show any significant change in the post-election violence period compared to the month of November 2007 for the facilities that had complete data.

The only stock-out days (days for which a facility did not have a specific medication in-stock) for the antiretroviral (ARV) medications of the nine medications examined for January-February 2007 and 2008, were in Nyanza and Rift Valley provinces. For Rift Valley province, the only stock out was with the combination pill of lopinavir/ritonavir (Kaletra) and the days did not change from 2007 to 2008 (29-31), each month. For Nyanza, nevirapine, stavudine, or lopinavir/ritonavir was stocked out for each of the four months examined with only January 2007 having two medications stocked out and the days of stock-out being reduced from 21-30 to 2-6 days for 2007 to 2008, respectively.

CHAPTER FIVE

5.0 DISCUSSION

5.1 Discussion

HIV/AIDS still remains a major public health problem in Kenya. The Kenyan Ministry of Health working with implementing partners has gone a long way to providing ART services to people living with HIV/AIDS. However, the post-election violence in 2008 is likely to reverse some of the gains already made.

In this study, 13.4% of participants had relocated to new districts at the time of study with 7.5% being at different health care facilities rather than their normal facilities of care in mid-march, 2008. The most common reasons for change of facility of care included having moved from district of residence since December 30, 2007, roads blocks and the usual clinic they visit not providing services. Change in home and hospitals could lead to social stigma as patients have to disclose there HIV status to new people and start follow up in new facilities.

In addition, 22% of the participants reported inability to access medical care during the post-election period. The numbers were higher in Rift and Nyanza provinces where the post-election violence witnessed was greater. A result of participants moving, changing facilities and unable to access care was ART non adherence. This was witnessed with 9.4% of the participants reporting missing ART in January and February 2008. This increase in non-adherence to ART was significant compared with those who had missed ART in November 2007 in Nyanza and Rift Valley provinces. Similarly, participants reporting

missing ART/CTX therapy and days of therapy missed per 1000 were significant mainly in Nyanza and Rift Valley provinces with no significant effect seen in Central province.

Inability to access routine health care and inability to access care when feeling ill were significant factors associated with participants' non adherence to both ART and CTX in all the provinces.

For service utilization, the hospital records did not provide complete data but the facilities that had complete data showed that the services had being disrupted in the post-election period with less number of patients seeking services especially counseling and testing services in labor wards and VCT centers. Drug stock outs were only witnessed in Nyanza and Rift Valley provinces but they were not statistically significant in the analysis.

Access to health care facilities in times of disaster and conflict is a major challenge faced by patents and health care providers alike. HIV infected patients; especially those on ART therapy are at greater risk because of the need for close follow up and ready hospital access. With break down of infrastructure during conflicts, transport and communication are greatly affected and thus access to health facilities is reduced (Zwi *et al.*, 2002). As seen in our study, the one most common factor for failure to access care during the post-election period was road blocks. The Rift Valley and Nyanza provinces had more participants reporting inability to access care and were the provinces hardest hit by the post-election violence with road blocks and health facility closures (Obonyo *et al*, 2008).

People living with HIV/AIDS in developing countries, reported additional barriers to ART adherence like social stigma, migration and travel, fear of disclosure of HIV infection status, decreased quality of life, work and family responsibilities and lack of access to medication (Weiser *et al*, 2003). In our study, migrating and changing facility of care, were not significant factors for participants' non-adherence to ART or CTX. However, inability to access medication and care when ill were significant factors to non adherence to both ART and CTX.

During times of political conflicts, medical services and health programmes maybe disrupted with supplies to the health care facilities affected and outreach programmes like PMTCT mobile clinics not functioning (Murphy & Berggren, 2004). Our study showed a decrease in the number of women tested for HIV in the labour ward. This has implications in care and treatment for pregnant women as they fail to receive antiretroviral therapy at appropriate stage of gestation with the possibility of delivering with unknown HIV status and thus PMTCT measures not instituted in time. Looking at medical supplies, our study did not show any significant disruption of ART medication supply during the post-election violence period.

The recommended guidelines for ART in Kenya include NNRTI-containing regimens (NASCOP, 2005). With participants reporting missing ART therapy from our study, there is possibility of treatment failure in this group as studies have shown that interruptions in ART with NNRTI-containing regimens may lead to increased rates of virologic failure and antiviral drug resistance (Braitstein *et al.*, 2006; Weidle *et al.*, 2006).

5.2 Study Limitations

- The study was designed primarily to examine effects of post-election violence on HIV patients care and treatment at the province level. Clearly, the effects of the unrest varied within provinces, at district or facility level, and significant effects might not be as apparent in provincial-level analysis. Similarly, the situation at healthcare facilities was dynamic, as conditions changed rapidly over days and weeks. Relying upon analysis of monthly facility record data, the study may have been unable to detect significant changes that occurred daily or weekly.
- The assessment may have underestimated the effect of post-election violence on individuals with HIV by interviewing participants who were present at a health facility and therefore able to access health care. Data was not captured from patients who previously had attended a given health facility but were otherwise prevented from returning to the health facility.
- Large amount of data were collected from facility record registers, and not all of it was usable. Use of non-standard registers was found to be in use in different departments of health facilities. The quality of the data recorded in the registers also varied by facility and within facilities.
- The use of cross-sectional study design was limiting since information was collected from one point in time and there is a potential for bias. The time frame of reference in the patient interviews was the period

November 2007 to February 2008; therefore, some degree of recall bias must be taken into account. Although the interviewers were well trained on interviewing technique, the possibility of interviewer bias can not be ignored.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The post-election violence clearly had a range of adverse effects on HIV patients in the three provinces where the assessment was conducted. These effects varied substantially by area, with the Rift Valley Province being most affected and the Central Province being least affected. Overall, the study found that among patients who had returned to health facilities by mid-March, the impact on long-term medication therapy was modest in Rift Valley, less in Nyanza, and not significant in Central Province.

Lack of access to health services had a major contribution to non adherence of both ART and CTX. However, most of the participants reportedly managed to avoid treatment interruptions.

Utilization of health services by HIV-infected patients in affected areas had decreased in the post-election period; but, seems to have returned to baseline in February in Nyanza Province and remained higher in Rift Valley Province, suggesting that post-election violence effects resolved more rapidly in Nyanza Province. The effects of the post-election violence may, however, be underestimated because of limitations in the study design.

6.2 Recommendations

Some recommendations arising from this assessment focus on steps that might be taken to strengthen services during stable times that could also improve their ability to function during times of crises (man-made or natural).

- There is need to provide HIV medications in quantities sufficient for periods greater than one month. In many facilities, it remains standard to dispense a 30-day supply of ARV. National HIV program planners should consider the feasibility of changing dispensing standards, within the constraints imposed by ARV supply issues, and take into consideration the possibility that less frequent contact with health providers could negatively affect adherence. If it is not seen as feasible and prudent to increase the quantitities of drugs routinely dispensed, at least this should be considered when the possibility of societal or environmental upheavals is foreseen.

- Health facilities should maintain some greater reserve of drugs in case the supply chain is disrupted.

- Implementation of an electronic medical records system that would facilitate transfer of information from one facility to another or adoption of the use of duplicate patient record cards, so that one copy could remain at the facility and the other could be carried by the patient. The importance of health records, especially in people on long-term therapy, should be emphasized to patients and to healthcare workers as part of adherence education. Patient education for HIV patients should

emphasize essential details such as the names of the drugs in the regimen. If facilities are not able to provide patients with summary cards containing critical medical history, as suggested above, patients could be educated to write down their medications and routinely carry this information in a purse, wallet or other convenient location. Patients should also be taught to carry adequate supplies of medication whenever they leave home. In addition, greater clinician use of standard national drug regimens for HIV treatment would reduce confusion when patients on long-term therapy find themselves seeking care at a different facility where records are not available.

- In preparing for future crises, the Government of Kenya, including the health ministries, should train people in disaster management. To improve medical services in times of crisis, the government should provide transportation when travel is difficult or dangerous, and that facilities should have adequate quarters for staff to stay when movement between home and health facilities is not feasible. In the preparation of future emergencies, mechanisms to communicate better with the end-users of guidance need to be established ahead of time.
- For participants with reported interruptions in ART with NNRTI-containing regimens, there is need to follow up these patients and further studies are needed to investigate drug resistance.

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APPENDICES

Appendix 1: Consent Form

Interview Consent Form

To be read to adults (age 18 and older), to emancipated individuals age 15-17 years with no parent/guardian or live without their parent/guardian and to all other individuals age 15-17 years old in the presence of a parent or guardian.

Good morning/afternoon. My name is …. And I am from the Ministry of Health. We are conducting a survey on HIV/AIDS and other health issues, in partnership with Kenya Centers for Disease Control and Prevention, to determine if there was any impact of the post-election violence on health care. We are asking people from a number of provinces if they can participate. This survey will help develop better strategies to respond to problems with health care delivery in the future. We would very much appreciate your participation in this survey.

Participation in this survey is voluntary. If you agree to participate, I will ask you some questions about yourself (for example, your age). Other questions will be about your use of health facilities, medications, and symptoms you have had over the last few months. Some questions will be about your feelings. This interview will take about 30 minutes. All of your answers will be kept strictly confidential.

Some questions may make you feel uncomfortable. You are free to refuse to answer any questions. Also, you can stop the interview at any time.

There are no direct benefits to you for choosing to participate in this interview. However, you will be helping MOH develop better programs to help Kenya today and in the future.

At this time, do you want to ask me anything about the survey? If you have any questions at any time, we want you to tell us. You can speak to the head of the survey team or I can give you contact numbers for one of the leaders of the project. Would you be willing to talk to us?

[INTERVIEWER: IF CONTACT NUMBERS ARE REQUESTED, PROVIDE THE FOLLOWING NUMBERS:

Appendix 2: KEMRI Non-Research Determination

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840 - 00200 NAIROBI, Kenya
Tel: (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: kemri-hq@nairobi.mimcom.net: director@kemri.org; Website: www.kemri.org

10TH March 2008

KEMRI/RES/7/103/2:

Agneta Mbithi et al
Principal Investigators

REF: Project Title: A Review of the impact of Post-Election Violence in Kenya on patients' Access to health Services, with focus on HIV, TB and other chronic conditions.

Investigators: **1.** Agneta Mbithi, Sapna Bamrah, Susan Cookson & Thomas Boo
2. Dr. S.K. Shariff and Dr. Ibrahim Mohammed et al.
3. Dr. Nicholas Wambua, Dr. Robert Breiman, Dr. Reinhard Kaiser, Dr. Marta Ackers, Dr. Mary Mwangi & Odylia Muhenje

I am pleased to inform you that the KEMRI Technical Review Committee, (TRC) for Non Research Proposals [NRP] during its 6th meeting held on Thursday, 6th March, 2008, discussed the above mentioned protocol, in which you are the PI.

The Committee Approved the Proposal for implementation :

Reference No. NRP 012/2007.....

Comments:- The Committee wishes you good speed in accomplishing the objectives of this protocol.

Dr. Peter M Tukei
CHAIRMAN, TRC

For Ag. Director
KEMRI

In Search of Better Health

Appendix 3: Ministry of Health Study Approval

MINISTRY OF HEALTH

grams: "MINHEALTH". Nairobi
Telephone: Nairobi 2717077
Fax: 2714130
When replying please quote
Email pphs@health.go.ke

AFYA HOUSE
CATHEDRAL ROAD
P.O. Box 30016
NAIROBI

MIS/17/4/108

29th February 2008

- Provincial Medical Officers of Health
- Medical Superintendents

Dear Sir/Madam,

RE: ASSESSMENT OF THE IMPACT OF THE POST-ELECTION VIOLENCE ON HEALTH CARE

Ministry of Health (MOH) and Centers for Disease Control and Prevention (CDC) are conducting an assessment of the impact of the Post-Election Violence on health care systems and delivery in 36 randomly selected health facilities.

I am writing to inform you that a team will be visiting your health facility in March hoping to collect data from log books, and a talk to both patients and health care workers regarding their experiences over the last few months. No identifying information will be collected from the facilities or any of individuals during the interviews and log book reviews.

Your full cooperation and necessary assistance to make this process smooth is much appreciated. This assessment will hopefully provide information on challenges and lessons learned during this difficult time.

Attached please find a list of facilities by Province.

Thank you in advance

DR. S. K. SHARIF OGW, MBChB, M. Med. DLSTMH, MSc.
CHIEF MEDICAL SPECIALIST/SDDMS
HEAD, PREVENTIVE & PROMOTIVE HEALTH SERVICES

mm/SKS
Encl

Appendix 4: Ministry of Higher Education Science and Technology Approval

REPUBLIC OF KENYA

MINISTRY OF HIGHER EDUCATION SCIENCE & TECHNOLOGY

Telegrams: "SCIENCE TEC", Nairobi
Telephone: 02-318581
E-Mail:ps@scienceandtechnology.go.ke

JOGOO HOUSE "B"
HARAMBEE AVENUE,
P.O. Box 9583-00200
NAIROBI

When Replying please quote
Ref. MOHEST 13/001/ 38C 496/2

25th August 2008

Dr. Agneta M. Mbithi
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 46347-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on, ***'Effects of Post Election Violence on HIV/Care and Treatment in Selected Districts,***

I am pleased to inform you that you have been authorized to carry out research Nyanza, Central and Rift Valley Provinces for a period ending 30th March, 2009.

You are advised to report to the Provincial Commissioners, The Provincial Directors of Education and the Provincial Medical Officers Health before embarking on your research.

On completion of your research, you are expected to submit two copies of your research report to this office.

M. GATOBU
FOR: PERMANENT SECRETARY

Copy to:

The Provincial Commissioner
Central Province
Nyanza Province
Rift Valley Province

Appendix 5: HIV CT registers Wilcoxson sign rank test

Central

	labornov	laborjan	laborfeb	diffjan	difffeb
	60	59	63	-1	3
	34	21	35	-13	1
	255	296	248	41	-7
	337	446	417	109	80
	109	147	121	38	12
	2	1	2	-1	0
	25	30	30	5	5
	193	122	83	-71	-110
mean				**13.375**	**-2**
median				**2**	**2**
pvalue				**p=0.62**	**p=0.69**
n(%)				**4/8(50)**	**2/8(25)**
		Nyanza			
	labornov	laborjan	laborfeb	**diffjan**	**difffeb**
	255	109	145	**-146**	**-110**
	118	62	71	**-56**	**-47**
	30	14	18	**-16**	**-12**
	3	9	3	**6**	**0**
	27	23	16	**-4**	**-11**
	4	0	1		**-3**
	31	1	31	**-30**	**0**
	27	21	20	**-6**	**-7**
	3	7	0	**4**	
	54	3	3	**-51**	**-51**
mean				**-33.2222**	**-26.7778**
median				**-16**	**-11**
pvalue				**p=0.04**	**p=0.02**
n(%)				**6/9(67)**	**7/9(77)**

Rift Valley

	labornov	laborjan	laborfeb	diffjan	difffeb
	37	31	35	-6	-2
	168	80	72	-88	-96
	20	19	17	-1	-3
	141	122	104	-19	-37
	256	245	263	-11	7
	250	60	70	-190	-180
	40	29	21	-11	-19
	63	47	45	-16	-18
mean				**-42.75**	**-43.5**
median				**-13.5**	**-18.5**
pvalue				**p=0.01**	**p=0.04**
n(%)				**8/8(100)**	**7/8(88)**

nyanza

	ctnov	ctjan	ctfeb	dif Jan	dif Feb
	76	45	103	-31	27
	305	76	196	-229	-109
	58	8	61	-50	3
	160	113	123	-47	-37
	47	40	54	-7	7
	224	130	154	-94	-70
	35	21	17	-14	-18
	175	220	210	45	35
	81	63	57	-18	-24
	132	65	101	-67	-31
	68	0	33		-35
mean				**-51.2**	**-22.9091**
median				**-39**	**-24**
pvalue				**p=0.02**	**p=0.13**
n(%)				**9/10(90)**	**7/11(64)**

central

	ctnov	ctjan	ctfeb	dif Jan	dif Feb
	22	24	20	2	-2
	211	225	191	14	-20
	133	133	149	0	16
	99	13	58	-86	-41
	110	98	90	-12	-20
	205	240	210	35	5
	20	139	16	119	-4
	55	21	78	-34	23
	55	71	33	16	-22
mean				**6**	**-7.22222**
median				**2**	**-4**
pvalue				**p=1**	**p=0.22**
n(%)				**3/9(33)**	**6/9(67)**

Rift valley

	ctnov	ctjan	ctfeb	dif Jan	dif Feb
	652	425	442	-227	-210
	71	68	51	-3	-20
	381	109	409	-272	28
	160	141	37	-19	-123
	434	102	329	-332	-105
	190	123	131	-67	-59
	416	222	239	-194	-177
	2386	334	461	-2052	-1925
	70	29	0	-41	
	98	50	111	-48	13
mean				**-325.5**	**-286.444**
median				**-130.5**	**-105**
pvalue				**p=0.002**	**p=0.027**
n(%)				**10/10(100)8/9(89)**	

Appendix 6: Extract from Patient Questionnaire

PATIENT QUESTIONNAIRE

Patient ID number District No. Facility No.

DEMOGRAPHICS

Age Gender
___Male
___Female

Current marital status
___Single
___Married
___Widow
___Divorced/Separated

Province at present time
___Nyanza
___Central
___Rift Valley
Date of Birth _____

1. What district did you live in November, 2007? _____

2. Have you moved since the December elections?
___Yes
___No
___Don't know
___Did not answer

3. If yes, why did you move? ***Do not read choices, tick all that apply or write in***
___Fear of personal or family
___Violence Personal violence
___Violence against your family
___Loss of job
___Loss of income Loss of housing
___Loss of other resources
___Other (specify) _____

4. Has your income changed in the last 2 months because of the unrest?
___Yes
___No
___Don't know
___Did not answer

HEALTH CARE ACCESS

5. Since December 30 2007, has there been a time when you were not able to get health care that you needed?
___Yes
___No
___Don't know

___Did not answer

6. If yes, for how long? _____days

7. If yes, why? *Do not read answer choices, tick all that apply.*
___Moved
___Clinic/hospital facility not functioning
___Cannot afford transport
___ Afraid to travel
___Afraid to go to the facility
___Lack of transportation
___Road block
___Available but denied healthcare
___Cannot afford
___Usual clinic/hospital facility did not provide service I need
___Other (specify)

9. Is this the clinic/hospital facility where you normally seek health care?
___Yes
___No
___Don't know
___Did not answer

10. If no, why has it changed? *Do not read answer choices, tick all that apply.*
___Moved
___Clinic/hospital facility not functioning
___Cannot afford transport
___ Afraid to travel
___Afraid to go to the facility
___Lack of transportation
___Road block
___Available but denied healthcare
___Cannot afford
___Usual clinic/hospital facility did not provide service I need
___Other (specify)

11. Was there a time in January or February 2008 that you or your child were ill enough to go to the health facility but did not go?
___Yes
___No
___Don't know
___Did not answer

12. If yes, why? *Do not read answer choices, tick all that apply.*
___Moved
___Clinic/hospital facility not functioning
___Cannot afford transport
___ Afraid to travel
___Afraid to go to the facility
___Lack of transportation
___Road block
___Available but denied healthcare
___Cannot afford
___Usual clinic/hospital facility did not provide service I need
___Other (specify)

CHRONIC ILLNESS - If given a range of days, try and clarify, if they cannot, round

13. Have you ever been on treatment for HIV infection?
___Yes
___No
___Don't know
___Did not answer

14. If yes, are you on ART, cotrimoxazole (Septra, Septrin, or CTX), or both?
___ART
___CTX
___Both

15. If on ART treatment, did you miss any days of treatment in November 2007?
___Yes
___No
___Don't know
___Did not answer

16. If yes, how days did you miss? _____Days

17. If yes, was it nevirapine, efavirenz, or triomune?
___Yes
___No
___Don't know
___Did not answer

18. How many days were given in your November refill? _____days

19. If on ART treatment, did you miss any days of treatment in December 2007?
___Yes
___No
___Don't know
___Did not answer

20. If yes, how days did you miss? _____Days

21. If yes, was it nevirapine, efavirenz, or triomune?
___Yes
___No
___Don't know
___Did not answer

22. How many days were given in your December refill? _____ days

23. If on ART treatment, did you miss any days of treatment in January 2008?
___Yes
___No
___Don't know
___Did not answer

24. If yes, how days did you miss? _____Days

25. If yes, was it nevirapine, efavirenz, or triomune?
___Yes
___No
___Don't know
___Did not answer

26. How many days were given in your January refill? _____days

27. If on ART treatment, did you miss any days of treatment in February 2008?
___Yes
___No
___Don't know
___Did not answer

28. If yes, how days did you miss? _____days

29. If yes, was it nevirapine, efavirenz, or triomune?
___Yes
___No
___Don't know
___Did not answer

30. How many days were given in your February refill? _____ Days

31. If on CTX treatment, did you miss any days of treatment in November 2007?
___Yes
___No
___Don't know
___Did not answer

32. If yes, how days did you miss? _____days

33. If on CTX treatment, did you miss any days of treatment in December 2007?
___Yes
___No
___Don't know
___Did not answer

34. If yes, how days did you miss? _____ days

35. If on CTX treatment, did you miss any days of treatment in January 2008?
___Yes
___No
___Don't know
___Did not answer
36. If yes, how days did you miss? _____days

37. If on CTX treatment, did you miss any days of treatment in February 2008?
___Yes
___No
___Don't know
___Did not answer
38. If yes, how days did you miss? _____days

VIOLENCE AND BEHAVIOUR QUESTIONS

39. Have you experienced any physical violence since December 30, 2007?
___Yes
___No
___Don't know
___Did not answer

40. Have you witnessed any physical violence since December 30, 2007?
___Yes
___No
___Don't know

___Did not answer
41. Has any member of your family experienced harm or violence since December 30, 2007?
___Yes
___No
___Don't know
___Did not answer

42. Has any member of your family witnessed harm or violence since December 30, 2007?
___Yes
___No
___Don't know
___Did not answer

43. Do you have anything else you would like to share with me about your experiences with health care in the post-election time period?

Thank you very much for your time.

Appendix 7: Registers Form

Date __ __ / __ __/ 08 **Team Number** __ **Recorder** __ __

Province (circle) Nyanza Central Rift Valley

District No. (#, from list of codes) ___ **Facility # (from list of codes)** ___

1. Is antiretroviral therapy for HIV (ART) provided? Yes / No
If yes, complete table below

5. ART Register

WEEK (2007 and 2008)	**# new patients**	**# new ART patients**	**# existing ART patients**	**# total patients**	**# missed clinic app'ts**	**# missed drug pick-up app'ts**	**# unplanned appointments**
2007:	**2***	**3**	**4**	**5**	**6**	**7**	**8**
1-7 Jan (wk 1)							
8-14 Jan (wk 2)							
15-21 Jan (wk 3)							
22-31 Jan (wk 4)							
1-7 Feb (wk 1)							
8-14 Feb (wk 2)							
15-21 Feb (wk 3)							
22-28 Feb (wk 4)							
1-7 Nov (wk 1)							
8-14 Nov (wk 2)							
15-21 Nov (wk 3)							
22-30 Nov (wk 4)							
1-7 Dec (wk 1)							
8-14 Dec (wk 2)							
15-21 Dec (wk 3)							
22-28 Dec (wk 4)							
2008:							
1-7 Jan (wk 1)							
8-14 Jan (wk 2)							
15-21 Jan (wk 3)							
22-31 Jan (wk 4)							
1-7 Feb (wk 1)							
8-14 Feb (wk 2)							
15-21 Feb (wk 3)							
22-29 Feb (wk 4)							

Noted: *

Column 2: # new patients, new for that time period regardless of treatment

Column 3: # new ART patients, new for that time period as far as being on ART
Column 4: # existing ART patients, excluding Column 2 and 3
Column 5: # total visits, should be combination of Column 2—4
Column 6: # missed clinic appointments
Column 7: # missed appointments for picking up medications

2. Is HIV medication given? Yes / No
If yes, complete table below

Month (2007 and 2008)	**Nevirapine**	**3TC**	**D4T**	**Efavirenz**	**AZT**	**Triomune**	**CTX***	**PEP kits†**	**Condoms**
January 2007									
# dispensed									
# of days with 0									
February 2007									
# dispensed									
# of days with 0									
January 2008									
# dispensed									
# of days with 0									
February 2008									
# dispensed									
# of days with 0									
# today									

Note: *CTX, Cotrimoxazole; † PEP, post-exposure prophylaxis

3. Is Counseling and Testing (DTC or VCT) provided at Facility? Yes / No

If yes, complete table below

HIV test	**CT Log Book (if service provided)**	
WEEK (2007 and 2008)	**# Tested**	**# of + HIV Results**
2007:		
Jan 2-6 (wk 1)		
Jan 8-13 (wk 2)		
Jan 15-20 (wk 3)		
Jan 22-27 (wk 4)		
Jan 29-Feb 3 (wk 5)		
Feb 5-10 (wk 1)		
Feb 12-17 (wk 2)		
Feb 19-24 (wk 3)		
Feb 26-Mar 3 (wk 4)		
2008:		
Jan 2-5 (wk 1)		
Jan 7-12 (wk 2)		
Jan 14-19 (wk 3)		
Jan 21-26 (wk 4)		
Jan 28-Feb 2 (wk 5)		
Feb 4-9 (wk 1)		
Feb 11-16 (wk 2)		
Feb 18-23 (wk 3)		
Feb 25-Mar 1 (wk 4)		

4. Are post-natal services provided? Yes / No

If yes, complete table below

	Women									**Infant**
WEEK (2007 and 2008)	**Total # visits**	**# known HIV +**	**# unknown HIV status**	**# Tested for HIV**	**Total # HIV +**	**# on PX***	**# counseled FP****	**# accept FP**	**# condoms given**	**# diag at 6 wk**
2007:										
Jan 2-6 (wk 1)										
Jan 8-13 (wk 2)										
Jan 15-20 (wk 3)										
Jan 22-27 (wk 4)										
Jan 29-Feb 3 (wk 5)										
Feb 5-10 (wk 1)										
Feb 12-17 (wk 2)										
Feb 19-24 (wk 3)										
Feb 26-Mar 3 (wk 4)										
2008:										
Jan 2-5 (wk 1)										
Jan 7-12 (wk 2)										
Jan 14-19 (wk 3)										
Jan 21-26 (wk 4)										
Jan 28-Feb 2 (wk 5)										
Feb 4-9 (wk 1)										
Feb 11-16 (wk 2)										
Feb 18-23 (wk 3)										
Feb 25-Mar 1 (wk 4)										

Note: * PX, prophylaxis; **FP, family planning