ADHERENCE TO ANTIRETROVIAL THERAPY AND ITS DETERMINANTS IN HIV POSITIVE CHILREN ATTENDING THE AIC KIJABE HOSPIAL, KENYA.

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Declaration

Declaration by candidate:

This thesis is my original work and has not been presented for a degree in any other university. No part of this thesis may be reproduced without prior written permission of the author and or Moi University.

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Declaration by the supervisors

This thesis has been submitted with our approval as university supervisors.

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DEDICATION

I dedicate this work to David my dear husband, and to my children Mercy, Newton and Lily. You were all the motivation and strength I needed, I will always be indebted.

Abstract

Background: Adherence to treatment is recognized as the essence of a successful antiretroviral therapy program. Ensuring optimal adherence to antiretroviral drugs requires more than 95% adherence rate. In children adherence is complex since it is pegged on the caretaker. Loss of the first line antiretroviral drugs to resistance due to non-adherence can be catastrophic.

Objective: To determine proportion and determinants of adherence among HIV positive children on anti-retroviral therapy at AIC Kijabe hospital.

Methods: The cross-sectional study was conducted at AIDS Relief Program Clinic at the AIC Kijabe Hospital. We sampled 214 caretakers of HIV positive children 1-14 years on anti-retroviral therapy for a minimum of three months: recruitment was by random sampling. Interview script were based on a validated modified Pediatric AIDS Clinical Trial Group (PACTG) adherence questionnaire that assesses child and caregivers demographic characteristics, recall of missed doses in past three days, difficulties experienced with administering medication and beliefs about antiretroviral drugs. The chi-square and Fisher's exact test was used to test for statistical significance between independent and dependent variables. A multiple logistic regression was used to test for associations between adherence and the statistically significant independent variables (caretaker's age, gender, education and occupation). AP-value of less than 0.05 was considered significant.

Results: Out of the 214 children in the study 109 (55.6%) were male, disclosure of their HIV status had been done for 56%. Majority of the caretakers 180(84.1%) were females, 87(40.7%) of the caretakers had attained secondary level of education. Ninety one 91(42.5%) had unskilled occupation. Their mean age (in years) was 41.6 (SD 12.7). More than half of them 128(59.8%) were biological parents of the child. Out of the 214 children 87.4% attained more than 95% optimal adherence rate. Caretakers age ($t=2.231$, $p<0.001$), education level ($\chi2=11.335$, $p<0.001$), occupation ($\chi2=10.024$, $p<0.001$) were negatively associated with child's adherence to medication though not statistically significant on the multiple logistic table. Most cited deterrents to adherence were forgetting 87%, interference with caretaker's schedule 76%, multiple caretakers 54.5% and stigma 47%.

Conclusions: Adherence to antiretroviral drugs at AIC Kijabe hospital was high than the low and middle income countries average. Child characteristics' and care givers characteristics had no association with adherence. Majority of the children had been disclosed to their status. And cited forgetting, scheduling multiple caretakers' and stigma as deterrents to adherence

Recommendation: We recommend clinicians and caretakers' to encourage disclosure of HIV status to children on antiretroviral drugs in order to optimize adherence to antiretroviral drugs.

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I wish God’s Blessings toyou all.

LIST OF ACRONYMS

AIC	African Inland Church
AIDS	Acquired Immunodeficiency Syndrome
ARV's	Anti-Retroviral
ELISA	Enzyme Linked Immuno-Sorbent Assay
FA	Full Adherence
HAART	Highly Active Antiretroviral Therapy
HIV	Human Immunodeficiency Virus
IMR	Infant Mortality Rate
IREC	Institutional Research and Ethics Committee
KEMRI	Kenya Medical Research Institute
KSHS	Kenya Shillings
MTCT	Motherto Child Transmission
OPD	Out-Patient Department
PCR	Polymerase Chain Reaction
PACTG	Pediatric AIDS Clinical Trial Group Study
PEPFAR	President's Emergency Plan for AIDS Relief
PLWHA	Persons Living With HIV/AIDS
PR	Pharmacy Refill
3DR	3 Day Recall
VAS	Visual Analogue Scale
W.H.O	World Health Organization
MANOVA	Multivariate Analysis Of Variance

DEFINITION OF TERM(S)

Adherence: in HIV is defined as the ability of the person living with HIV/AIDS to be involved in choosing, starting, managing and maintaining a given therapeutic regimen to control viral replication and improve immune function[2]

Child: Is human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier.[57]

Child Caretaker: Is an individual who gives physical or emotional care and support to a child.

CHAPTER ONE : INTRODUCTION

1.1 Background

HIV/AIDS is one of the most devastating pandemics humanity has ever faced. Globally, about 35.3 million people were living with the virus in 2012[1]. In the same year, children contributed to 10% of the total infected. Sub-Saharan Africa remains the most hard-hit region accounting for 68% of the total global burden[1]. New HIV infections among children have declined by 52% since 2001. Worldwide, 260,000 children became newly infected with HIV in 2012, down from 550,000 in 2001.

The introduction of powerful new antiretroviral therapies in the late 1990s led to significant improvements in the health and longevity of children with human immunodeficiency virus (HIV) infection.[1,2] Coupled with successful interventions to reduce the risk of perinatally acquired transmission, therapeutic advances have markedly reduced morbidity and mortality in countries with access to treatment.[3] Optimism about these early successes have, however, been cooled off by a growing understanding of the significant challenges to maintaining long term adherence to multidrug antiretroviral regimens.[4]

Adherence rate as high as 95% has been proved to suppress viral replication maximally in children with HIV/AIDS. Estimates of paediatric adherence to HAART in Africa have just begun to emerge, with studies showing adherence rates in this vast continent to be between 60% and 80%[5, 6].In our African settings, it is very important to promote and sustain adherence to ART because viral resistance to the few available treatment options would be devastating[11].

The rate and determinants of paediatric HAART adherence in Kenya remain largely studied in the western parts of the country with 75% of the children on anti-retroviral

therapy attaining above 95% adherence[5, 6, 7], few studies have been carried out in the central part of Kenya reporting adherence of above 95% in children on antiretroviral drugs at 70%[14].Since most studies done on adherence correlates are in the western region of Kenya there is urgent need to determine the rate and determinants of paediatric adherence in central Kenya. The aim of the study is finding out the rate and determinants of adherence to antiretroviral therapy among children living with HIV/AIDS in Kijabe, Kiambu County Kenya.

1.2 Statement of the problem

There is little known about adherence rates and its determinants in central Kenya, most adherence studies in paediatric antiretroviral therapy have been carried out in the western part of Kenya[5, 6, 7] likely due to the presence of an academic model of HIV care in the region. On the other hand central Kenya runs on clinical models of care thus little research has been carried out in this region. Western Kenya has an adherence of 75% whereas in central Kenya adherence is rated at 70%.

Antiretroviral adherence in young children poses unique and formidable challenges. The ability of HIV-infected children to adhere to ART is essential to delay resistance and ensure lifelong effective treatment. However, adherence is deemed as the most significant challenge to children receiving ARVs. Young children depend on care givers and may have particular difficulty taking medication.If the child does not manage to adhere to treatment, the quality of life deteriorates over time, resulting in increased child mortality as a result of HIV or drug resistance and this may result in need for second line drug regimens. The drugs required for this are generally too expensive to be provided in resource poor countries, Kenya being one such country.

The WHO Patient Monitoring Guidelines for HIV Care and Antiretroviral Therapy (ART) 2006 states: “It is essential for each ART programme to decide how adherence will be measured and to develop and monitor its own site-specific indicators that are both practical and feasible”. This lack of standardized guidance requires surveys that would aid in understanding rate and determinants of adherence in our set up.

Thus our study aim was to find out the rate of adherence in our study population and if the studied determinants of adherence do affect our population.

1.3 Justification

Inadequate adherence increases the risk of drug resistance and treatment failure. Therefore, optimum adherence is highly essential for sustainable success to highly active antiretroviral treatment[89]. Taking greater than 95% of prescribed doses is recommended for optimal virologic suppression and to minimize the rate of treatment failure[88]. Virologic failure rate of greater than 50% is associated with less than 95% adherence rate[88].Adherence is deemed as the most significant challenge to children receiving antiretroviral therapy due to developmental immaturity, their particularity of eating habits, and a lack of knowledge about their disease.[16,40,23,]. Young children depend on caregivers and may have particular difficulties when taking medication.Well-known barriers identified in quantitative studies in Sub-Saharan Africa include: caregivers’ perceived difficulty for administrating ART, child does not know his/her sero-status, and older age of child[73,83,84]. If the child does not manage to adhere to treatment, the quality of life deteriorates over time, resulting in increased child mortality as a result of HIV or the child can be affected by drug resistance and may need to begin second line drug regimes. The drugs required for this are generally too expensive to be provided in resource poor countries, Kenya being one such country.

As a result, the guideline for Adherence HIV care and treatment in Kenya recommends at least two adherence sessions which include caregiver education and counseling before ART initiation. The same guideline also recommends adherence reinforcement at each follow-up visit. Therefore, assessment and support of adherence is fundamental to successful antiretroviral therapy and prevention of drug resistance[19].

The crucial role of family support in pediatric adherence can be compromised by other associated burdens, such as low income, an HIV-infected parent, orphan status, stigmatization, or unclear familial responsibilities regarding the child's medication adherence[6, 40,] and [81]. Our study aimed to determine the proportion of adherence in our study site and attempted to identify studied determinants of adherence in our study population. This was to assist in drawing up models to enhance adherence.

1.4 Conceptual frame work

The Adherence conceptual frame work in figure 1 was developed by World Health Organization (W.H.O). It identifies service factor, patient factor, and social economic and cultural factors leading directly or indirectly to suboptimal adherence to antiretroviral therapy. This study aimed to identify some studied patient factors and social economic factors in relation to paediatric adherence.

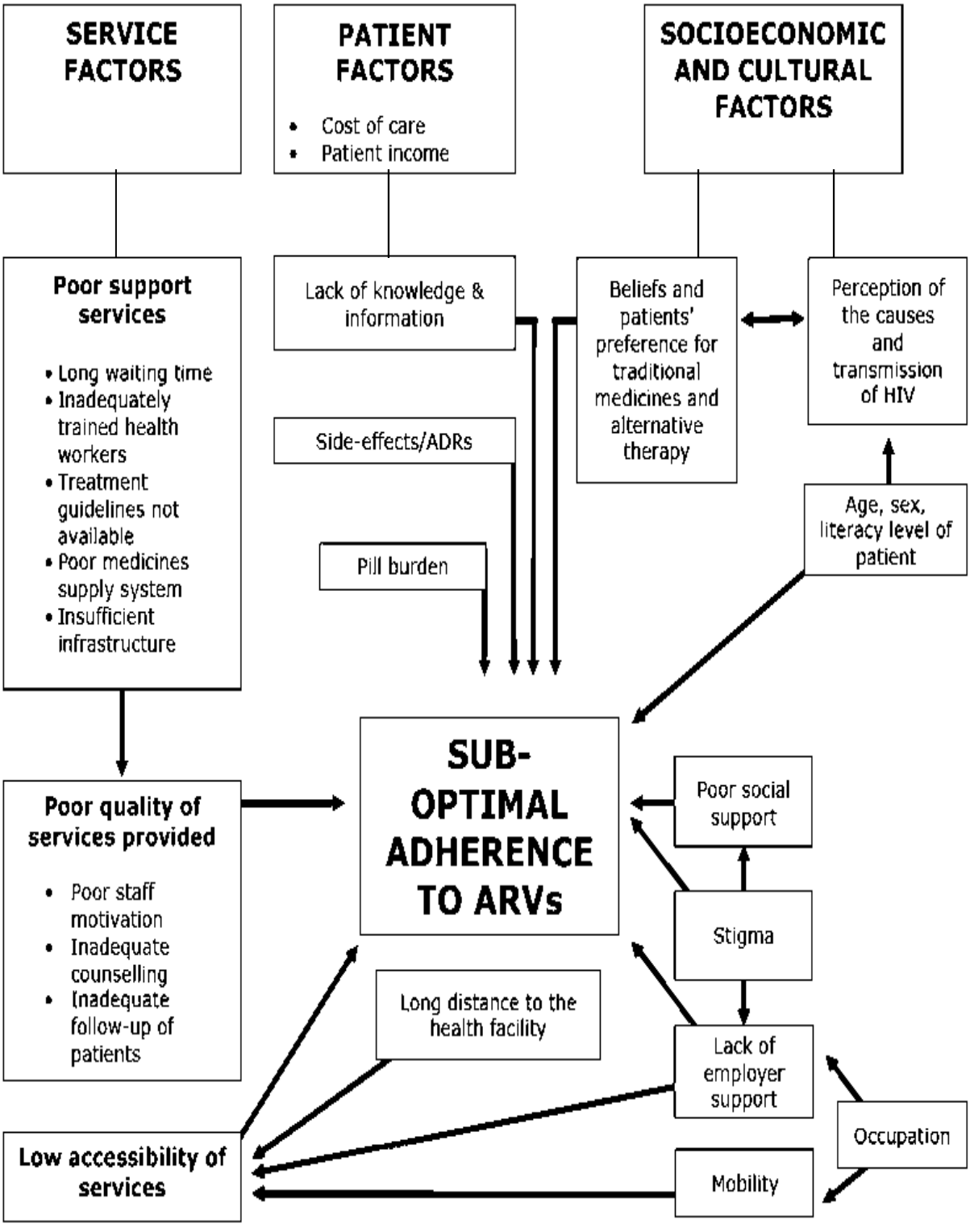


Figure 1.0 CONCEPTUAL FRAMEWORK

CHAPTER 2: LITERATURE REVIEW

According to the 2012 Kenya AIDS indicator survey (KAIS) it is currently estimated that there are 101,000 children living with HIV in Kenya. Use of antiretroviral drugs was not assessed in KAIS 2012[20]. The HIV epidemic in Kenya has resulted in a 30% increase in mortality among infants and young children. This means that a third of all infant deaths can now be attributed to AIDS.Optimal adherence in thepaediatric population is poor.

An estimated 27,400 children were newly infected with HIV in 2009. Modelling data from UNAIDS indicates that if all interventions are scaled up and Global Plan targets achieved, there would be 4,600 new child infections in 2015, and 83% decline in the number of new child infections[11].

2.1: Adherence rate

Despite the gains seen with HAART, adherence still remains suboptimal and ranges from 49% to 100% worldwide but largely depended on the definition of adherence, the methods used to assess it and the study setting [4, 5, 6, and 7,8,9,26,28.] In Kenya according to a study done at Academic Model Providing Access to Healthcare (AMPATH) a PEPFAR funded program based in Moi Teaching and Referral Hospital, Eldoret looked at279 children on ART enrolled between August 2002 and February 2005. Method used was retrospective review of prospectively recorded electronic data in nine HIV clinics in western Kenya. Main measure was Orphan status, CD4%, sex- and age-adjusted height (HAZ) and weight (WAZ) z scores, antiretroviral adherence, mortality.The median CD4% was 9% and increased dramatically during the first 30 weeks of therapy, then formed a plateau. Parents and guardians reported perfect adherence at every visit for 75% of children. Adherence and orphan status were not significantly associated with CD4% response[6].

2.2: Measurement of adherence

Although there is no “gold standard” for the measurement of medication adherence in children[13], different methods have been used with varying success. In general, direct methods, such as direct observation and therapeutic drug monitoring, are more objective and yield more-reliable assessments of adherence than are indirect methods, such as self-reporting, electronic monitoring, and pill counting[10]. Patient self-reporting is the most common method of assessing adherence, although inaccuracy may result from imprecise or inconsistent questioning, patient forgetfulness, or the patient’s desire to provide socially desirableanswers[5, 15]. Nevertheless, questioning that is carefully structured, non-judgmental, and culturally appropriate may yield accurate information about adherence and has been shown to be the best indicator of non-adherence [17, 19].

In a cross-sectional study conducted in Thika District hospital in the year 2011, two hundred caretakers of children living with HIV on ART were consecutively sampled adherence was defined as taking 100% of the prescribed medication in the last 24 hours. Adherence rate in this study was reported to be 42%.

Mghambi et al in a descriptive cross-sectional study involving HIV infected children aged 2–14 years, in three municipal hospitals in Dar-Es-Salaam looked at 300 patients and accompanying caretakers on nevirapine-based antiretroviral treatment for at least six months. Caretakers’ report and medication return showed good adherence 98% and 97% respectively. However, the 85%level of adherence assessed by nevirapine plasma concentration was significantly lower than caretaker report and medication return ($p < 0.001$). Mghambi et al concluded that both care takers report and medication return over estimated adherence rates[14].

Although self-reports has been said to overestimate the extent of patient adherence to medication [20, 21], a number of studies have demonstrated an association between self-

reported adherence and HIV RNA, which suggests that self-reports may be a valid indicator of adherence [2,4, 22].A 3-day recall tool was shown to be a useful surrogate marker for monthly adherence and predicted virological response to highly active anti-retroviral therapy in a randomized trial of protease inhibitor-containing combination regimens in children with HIV infection[10]. Similarly, the largest study to date outside the clinical trial setting found that children whose caregivers reported no missed doses in the previous week were more likely to have an undetectable viral load of<400 copies per mL.[6]

2.3 Determinants of adherence

A multi-centre cross-sectional study carried out in Italy found no relationship between adherence and socio-demographic or clinical features of children. A slightly increased adherence was observed in children on HAART as compared to those on post-exposure regimens, and coincidentally in those taking more than six doses per day adherence was also increased. An increasing adherence rate was also observed in children with more advanced HIV. A similar pattern has been reported in adults and it is likely to be associated with an increased perception of disease severity [19, 20]. The perception of the beneficial effects of HAART may also increase adherence. In the Italian study caregiver factors were studied and it was observed that children with foster parents had better adherence than children with second class relatives or biological parents. Thus suggestions were made to try follow up and train biological parents just like foster parents. No studies reviewed looked at the correlation of the sex of the caretaker and adherence. The study concluded that the psychosocial characteristics of both caregivers and children play a major role in adherence and supports the concept that factors associated with adherence tend to be those that are not routinely assessed in clinical practice [21].

A 2008 cross-sectional study conducted on 300 caretakers of children living with HIV/AIDS, on anti-retroviral therapy in central Kenya in three government facilities namely Nyeri County, Thika sub-county and Karatina sub-county hospitals on factors that influence non-adherence to antiretroviral therapy among AIDS patients came up with the following findings: the level of adherence in Central Province, Kenya was sub optimal at 70%. Patient factors such as age, household size, alcohol use, occupation, education and social economic and cultural factors such as poverty, transportation cost, cost of food, absenteeism from work, stigma and discrimination, denial, lack of family support, community and employer support, preference to traditional medicine, belief in spiritual healing (religion) profoundly influenced non-adherence to ART[10].

In an American survey administered at three sites that participated in the Paediatric Spectrum of Disease Project, 90 caregivers were interviewed with regard to their child's adherence to medications[16]. Seventeen percent reported having missed at least 1 dose in the preceding 24 hours. A viral load of less than 400 copies / ml was found in 50% of the children who reported no missed doses and in 24% with missed doses. In a retrospective review of children who received HAART at a single clinic, adherence, based on pharmacy records, was associated with virological response to therapy.[44] Children who had at least 75% of their prescriptions filled had significant full viral suppression.

In thirteen studies of children's adherence to ART, conducted between the years 1981 and 2002, few investigations identified predictors/correlates of adherence. These are social economic status, child caregiver relationship, parent's belief, religion and orphan status but these appear generally similar to those found in adult samples[8, 26]. Recommendations for future investigations on predictors or correlates were proposed[8].

The Paediatric European Network for Treatment of AIDS trial (PENTA 5) was a randomised partially blinded multicentre comparative trial in previously untreated children age 3 months to 16 years. The trial was divided into Parts A and B: All children (part A and B) were randomised to one of 3 dual NRTI regimens, zidovudine (ZDV) and lamivudine (3TC) or ZDV and abacavir (ABC) or 3TC+. Children in part A (asymptomatic) were also randomised to additional nelfinavir (NFV) or matched NFV placebo (NFV). Children in part B (symptomatic) all received open-label NFV. At 4, 12, 24 and 48 weeks caregivers completed a questionnaire. Adherence was assessed by a question asking about number of doses missed in the previous 7 days. Questions were also asked about difficulties taking individual drugs, the most difficult doses to remember and how much taking HAART interfered with everyday life. When caretakers were asked to describe the degree of interference with daily life that the administration of the medication caused, 43% of parents described it as 'moderate' or 'great': Caregivers' concerns included forgetting to administer doses of medication, taste of medicine, and volume of trial medication. In 194 (74%) questionnaires, full adherence was reported for the previous 7 days. In the remaining 69 (26%): 63 reported missing 1-3 doses, 6 reported missing more than 3 doses. Out of the four questionnaires at 4, 12, 24 and 48 weeks forty five percent (45%) reported non-adherence on one or more questionnaires. There was a non-significant trend of decreasing adherence over time between weeks 4 and 48 ($p=0.2$). Ethnicity and the child’s knowledge of HIV infection did not affect adherence though only 8 children knew their HIV infection status and thus it was not significant.

CHAPTER 3: RESEARCH QUESTIONS, OBJECTIVES, LIMITATION

3.1 Research questions

1. What proportion of HIV/AIDS children adhere to Anti-Retroviral therapy?

2. What are the determinants of adherence among HIV/AIDS children on highly active antiretroviral therapy at AIC Kijabe Hospital?

3.2 Objectives of study

3.2.1 Broad objective

- To determine proportion and determinants of adherence among HIV positive children on anti-retroviral therapy at AIC Kijabe hospital.

3.2.1 Specific objectives

1. Determine proportion of HIV positive children who adhere to Anti-retroviral drugs

2. To determine child and care giver characteristics that influence adherence to pediatric antiretroviral drugs at the study site

3.3 Study limitations

While were not able to report on the viral load of the participants because of the cross-sectional nature of the study design and cost, systematic reviews have demonstrated good correlation between drug adherence as assessed by caregiver reports or self-reports with patients' virological response[13, 16].

3.4 Study design:

Cross-sectional study design was preferred since it does not require follow-up and is therefore less costly and quicker than other designs.The main out come and associations could be easily compared.

The disadvantage of cross-sectional study is that since exposure and disease status are measured at the same time it is not possible to determine the direction of the association. In other words, it is not known if the exposure preceded the disease and is therefore a potential cause of disease.

3.5 Study site:

The study was conducted at Kijabe Hospital's AIDSRelief Program which is a part of the bigger AIDSRelief Kenya a consortium funded through the President's Emergency Plan for AIDSRelief (PEPFAR). This Catholic Relief Services-led alliance includes the University of Maryland's Institute of Human Virology, Futures Group, Catholic Medical Mission Board and Inter-church Medical Assistance World. Started in the year 1999 the HIV services program in Kijabe has since grown from 8 patients to over 6000 patients. Children were enrolled from 2004 August with approximately 10-20 children. At the time the study was conducted the program had 637 children living with HIV/AIDS.

Due to growing numbers of clients and distance the program now has 5 satellite clinics, namely Naivasha, Njambini, Thigoi, Githuguri and Marira. The program provides access to free ART, as well as to comprehensive nutrition services, psychosocial support, and economic development training.

The AIDS Relief Kijabe clinic has 1 tropical medicine consultant, two medical officers, 3 clinical officers, 4 nurses, 6 social workers. The clinic runs from 8am to 5pm Monday to Friday, and the clinic staffs are available on all clinic days. On weekends one clinical officer or medical officer is available to review patients in the ward and attend to patients in the outpatient. The AIDS Relief clinic in Kijabe has 637 enrolled children with 372 on HAART. The clinic runs daily, though Thursdays are exclusively for pediatric patients and PMTCT mothers. The children enrolled into the program are from age 0 to 14 years.

The AIC Kijabe hospital is located in Lari division of Kiambu County, Kenya. It is approximately 60 kilometers from Nairobi by road. The County covers an area of 1.323.9 square kilometers. Boundaries are Nairobi city and Kajiado to the south, Nakuru County to the west, Nyandarua to the North-west and Thika to the East. The

district lies between $0^0$75’ and $1^0$20’ south of the Equator and longitudes $36^0$54’ and $36^0$84’ east. Kiambu County is a county in the former Central Province of Kenya. Its capital is Kiambu, and its largest town is Thika. The county is adjacent to the northern border of Nairobi County and has a population of 1,623,282. The county is predominantly rural, but its urban population is increasing as Nairobi is growing rapidly. Kikuyu are the dominant tribe in the county. In 2007, Kiambu District was subdivided in two: Kiambu East and Kiambu West. Kiambu West district took Limuru, Lari and Kikuyu divisions, with Limuru as its district capital.

3.6 Study population:

We sampled Caregivers of children 1 year to 14 years, attending the outpatient AIDSRelief clinic.

3.7 Inclusion criteria

Inclusion into the study was for children between 1 year to 14 years, HIV positive on first line anti-retroviral regimen for a minimum duration of three months and with a consenting care taker attending AID SRelief clinic at AIC Kijabe hospital were enrolled into this study.

3.7.1 Exclusion criteria

Exclusion was done for any childbed ridden more than 50% of the day during the last month, admitted in hospital in the last one month and any child transferred in

3.8 Sample size determination

Sample size was calculated using the fisher’s method[61, 62] of sample size calculation.

$$n = \frac{t^2 \times p\,(1-p)}{m^2}$$

n = required sample size
t = confidence level at 95% (standard value of 1.96)
p = estimated adherence rate in the project area (which is 70% adherent from prior studies) [10]
m = margin of error at 5% (standard value of 0.05)

N = size of target population (is 637 in AIC Kijabe hospital)

$$\mathbf{n = \frac{1.96^2 \times 0.7\ (0.3)}{0.05^2}}$$

=323

Since the sampling frame is less than 10,000(637) we adjusted the sample size using the formula below

n =n / (1+n/N)

=323 / (1+323/637)

=214

The minimum sample size required for the study was 214 HIV positive children on HAART.

3.9 Sampling method

A random sampling technique was employed to select the children to participate in the study. Clinic numbers for the 637 children enrolled in AIDS Relief Program were used to randomly pick the 214 children for the study. Randomization was done by use of computer software SPSS. The 637 clinic numbers were feed into the SPSS software it would then generate 214 randomly selected clinic numbers once participants were included or excluded the remaining clinic numbers were re-run till we achieved a total of 214 children for our study. After that every Wednesday I checked the clinic diary daily to ascertain who out of the randomized number would be attending clinic the following day.

3.10 Data collection

At the AIDS Relief program AIC Kijabe hospital children living with HIV/AIDS are recruited either via the general pediatric outpatient, inpatients for children who are ill and test HIV positive or form children born to HIV positive mothers on follow up in PMTCT who test HIV positive after Early Infant Diagnosis (EID). For the children undergoing early infant diagnosis a dry blood sample is taken from the heel of the child and sent for HIV PCR testing at 6 weeks, children who are reported to be positive are enrolled in the AIDS Relief clinic and started on HAART. Those that test PCR negative are then followed up as HIV exposed and an antibody test is conducted at nine months or earlier; if these children happen to develop HIV/AIDS signs and symptoms and HIV PCR is reported to be positive the child is confirmed to have HIV and is recruited into the program; if the child is negative the clinician can then repeat HIV antibody testing at eighteen months or six weeks after cessation of breast feeding in children above eighteen months. The children who are confirmed HIV positive are then drawn blood forCD4 count and viral load on first visit and at 3 months. The caretakers of the HIV positive children are then recruited into an adherence program which runs once a week in Kijabe and at the other satellite clinics.

The adherence program referred to as Treatment Preparation Studies (TPS)is a one day session the care-takers of HIV positive children are taught the meaning of HIV/AIDS, opportunistic infections, antiretroviral therapy; The duration of treatment, types of drugs used their side effects and drug resistance. During the sessions the caretakers are also taught on nutrition, exercise and disclosure.

At AIC Kijabe hospital HAART is started immediately after adherence counseling session. A week after initiation of treatment; The community health workers who are drawn from the community or are caretakers of children living with HIV conduct a

home visit to assess adherence at home. Patient is then reviewed at the clinic 2 weeks after initiation of HAART. Pill counts are done, weight and height are taken, and community health workers report on home visit is reviewed. The next follow up visits are scheduled every month.

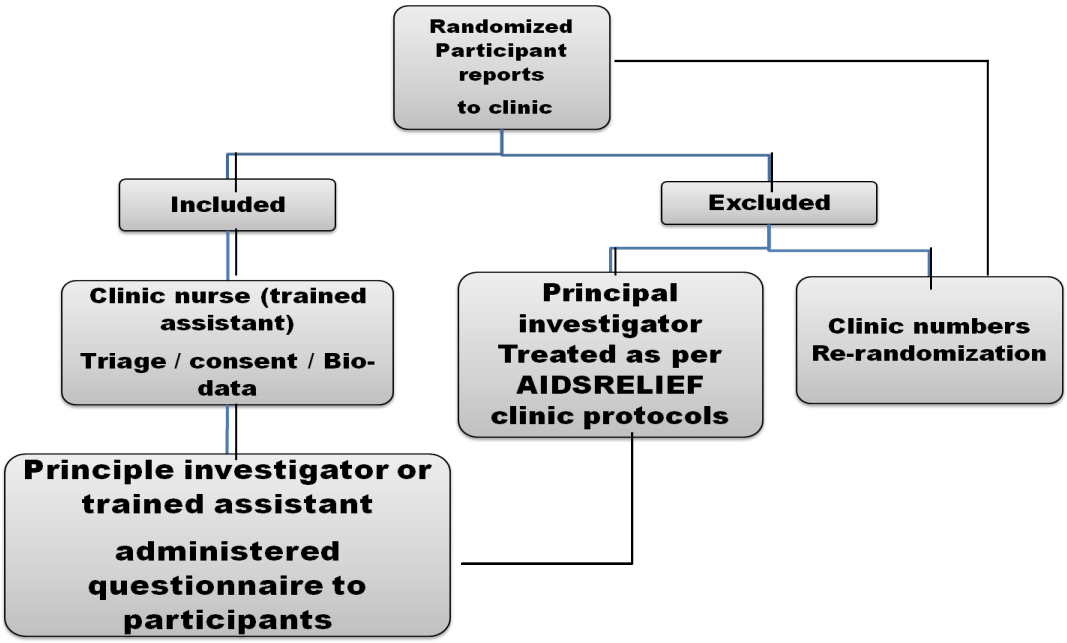
The study team was composed of the principle investigator, two clinical officers, and a Kenya registered nurse. The team was trained and certified by the principle investigator on the study procedures; the training involved recruitment procedures, consent taking and administration of the questionnaire. Pretesting of ten questionnaires was done as part of the training at Marira Health centre which is an AIDS Relief satellite clinic in Lari constituency.

On arrival at the clinic the trained nurse would follow the inclusion and exclusion criteria, and tick the random number on the randomization sheet and the diary for those who were included. This was done till we had a total of two hundred and fourteen children.

Caregivers of children who had been on HAART for at least 3 months and who consented to participate in the study were administered the questionnaire in an interview format during a scheduled clinic visit. The nurse took the caretaker through the consent, recorded vitals on the file, and bio-data on the questionnaire. Caution was exercised during the interview to avoid inadvertently disclosing the child's HIV status to the child because about 50% of the children in the cohort were not aware of their HIV status.

Once the nurse was through, the client was then attended to by the principle investigator or the trained clinical officer, who then ascertained that the client had fully understood the purpose of the study and answered any queries. The principle investigator or the clinical officer then did their final signature on the consent.

Before administration of the questionnaire, each participating caregiver was reminded that their child's doctors understood that taking all the doses of prescribed drugs is difficult, and thus that the interview was aimed at identifying hurdles to drug adherence and providing solutions. To reduce recall bias each participating caregiver was asked about drug administration for each day of the previous three days, starting with the immediate past day. Patients were then thanked and offered their routine clinic care as per AIDS Relief protocol by the principal investigator and or the trained and certified clinical officers.



fi

g 2. Patient flow

3.11 Data collection tools

Measurement of adherence by questionnaire

A semi structured pretested questionnaire was used to collect data from the primary caregivers in English. Interpreters where used for Swahili and Kikuyu. Questionnaires

have the advantages of being easy to administer, and generate information which is cost-effective, objective and versatile.

A standardized interview was administered by the principal investigator or trained clinical officer to each primary caregiver. The interview script is based on a validated modified Paediatric AIDS Clinical Trial Group (PACTG) adherence questionnaire[29] that assesses caregiver's ability to accurately describe the HAART regimen, recall of missed doses in the past 3 days, difficulties experienced with giving medication, and beliefs about ART. Based on reported missed doses, children were classified as not fully adherent (NFA) if more than one (1) dose was missed in the previous 3 days or fully adherent if all doses have been taken in the last 3 days. Interpreters were utilized so that interviews can be conducted in the language of the caregiver's choice

Caregiver 3-Day Recall (3DR) was assessed from the primary caretakers who were asked about drug administration behavior over the past 3 days. For this information, semi structured pretested questionnaire where used. Information on the number of dose is missed for each Anti retro-viral drug over the past 3 days and the reasons for missing them was recorded on the questionnaire.

Pill count / measured returned syrups (PC/ RS) as is routine at AIDS Relief clinic caregivers have to return all of the previously dispensed medication containers and bottles to assess the amount of medication left. The trained research assistants measured the amount of returned Syrup using a measuring cylinder. The clinic had five plastic 100ml graduated measuring cylinder of which we used to measure syrups, measurements were done in a small kitchenette in the clinic and hygiene was maintained by washing the cylinder in soap and running tap water after each measure. For the participants having pills in their regimen, the pills brought back were counted

and recorded on the questionnaire. If the syrup or pills are less or more than expected on return, then patients were considered non adherent.

Visual Analogue Scale (VAS) Primary caregivers were asked to rate their adherence on a Visual Analogue Scale (VAS) for the previous month, ranging from 0 to 100% in bands of 10's, marked on a vertical line. The caregivers were asked to rate their ability to administer drugs, 0% being "no drugs" administered and 100% "all doses" administered. The scale was interpreted based on the point at which the caregiver indicates for example if the client indicates 50% adherence is rated as 50%. The scale was administered by a trained research assistant or the primary care giver.

3.12 Data analysis

The collected data was processed through editing, coding, classification and tabulation. Double data entry was done in MS Spread Sheets or MS Access to eliminate errors after which it was ready for statistical analysis using SPSS software.

Our dependent variable was adherence and the independent variables were child characteristics, age, sex, WHO stage and disclosure; the caretakers characteristics Normality testing was undertaken for continuous variables so as to determine whether to use parametric or non-parametric methods of statistical analysis. Descriptive statistics were used to analyze children's and caregivers' characteristics and variables related to treatment outcome. Discrete data were described using counts and percentages. To express adherence as a dependent variable, the defined cut-off value was at 95% of the continuous data for all measures patients above this cut-off were defined as adherent, patients below as non-adherent.Chi-square (X^2) and t-test was employed to test for adherence rate (dependent variable) in relation to child and caretakers characteristics

(independent variables) a p-value0.05 was considered statistically significant.In a multivariate analysis, all factors associated with adherence by any measure with unadjusted P-value close to or=0.05 were included. The obvious confounders were age, education level and occupation of the care takers.

3.13 Ethical considerations

The study was approved by the Moi University College of Health Sciences (MU/CHS) and Moi Teaching and Referral Hospital Institutional Research and Ethics Committee (MTRHIREC)approval number FAN: IREC 000706 and from AIC Kijabe Hospital's Research and Ethics Committee (appendix VI).Enrollment into the study was purely on voluntary basis after seeking informed consent from the primary caregiver. Those that opted not to participate in the study had their decision respected and treatment was offered as per AIDS Relief protocol. Participant's confidentiality was addressed by ensuring that no disclosure was done unless with the caretaker's consent. Children were not involved in the study in order to avoid inadvertent disclosure during the study interview. The names of their children were not used and were not required for the study. All the clients received the standard care provided by the AIDS Relief staff irrespective of their participation in the study. Considering that this is a descriptive study, no intervention was undertaken thus the study participants who had concerns about possible harm where assured

CHAPTER FOUR: RESULTS

4.1 Child characteristics

Among the 214 children that participated in the study, majority were males, a high proportion had an entry WHO stage III. More than half of the children sampled had undergone disclosure of their HIV status. Table 1(a).

1(a) Child characteristics

CHARACTERISTICS	FREQUENCY (%)
GENDER	
FEMALE	95 (44.6)
MALE	119 (55.6)
WHO STAGE	
STAGE I	21 (9.8%)
STAGE II	30 (14%)
STAGE III	97 (45.3%)
STAGE 1V	66 (30.8%)
DISCLOSURE	
Yes	121(56.5%)
No	102 7%)

4.2 Caretaker's characteristics

Majority of the caretakers sampled were females. Most of them were biological parents of the child, a large number of the caretakers were on HAART. Table 1(b)

Table 1(b): Caretakers characteristics

Characteristic	Frequency (%)
Gender	
Male	34(15.9)
Female	180(84.1)
Education level	
None	19(8.9)
Primary	57(26.6)
Secondary	87(40.7)
Tertiary	51(23.8)
Occupation	
Unskilled	91(42.5)
Skilled	75(35)
Professional	48(22.5)
Relationship to child	
Biological parent	128(59.8)
Orphanage/shelter	33(15.4)
Other	53(24.7)
Primary care giver on HAART	
Yes	133(62.1)
No	81(37.8)

4.3 Adherence rate

On assessment of adherence by 3 day recall we found that 87.4% attained the optimal adherence rates of above or equal to 95% amongst the 214 children sampled. By pill count 74% attained optimal adherence rate and 70.1% by visual analogue also attained optimal adherence rate.

4.4 child characteristics in relation to adherence

In table 2 none of the child characteristics was statistically significant in relation to antiretroviral medication adherence (p>0.05). Table2

Table 2.Child characteristics and how they influence adherence

Factor	Adherence		χ2 value/t-value	P-value
	No (≤95%)	Yes (≥95%)		
Child characteristics				
Age	9(sd 3.4)	8.9(sd 3.1)	0.150	0.881
Gender				
Male	13(10.9)	106(89.1)	0.696	0.404
Female	14(14.7)	81(85.3)		
WHO stage				
I	7(23.3)	23(76.7)		
II	5(7.6)	61(92.4)	5.577	0.134
III	11(11.3)	86(88.7)		
IV	4(19.4)	17(81)		
Disclosure to child done				
yes	30(26.1)	82(73.9)	0.424	0.809
No	26(24.2)	76(75.8)		

4.5 Caretakers' characteristics in relation to adherence

Table 3 shows age, education level, and occupation were statistically significantly (p-value >0.05) associated with adherence to medication as indicated in Table 3

Table 3 Caretakers' characteristics in relation to adherence

Factor	Adhering		χ2 value/ t-value	P-value
	No	Yes		
Caretakers characteristics				
Age	47.5(sd 15.1)	40.8(sd12.1)	2.231	**0.033**
Gender				
Male	4(11.8)	30(88.2)	0.027	1.000
Female	23(12.8)	157(87.2)		
Education level				
None	5(26.3)	14(73.7)		
Primary	12(21.1)	45(78.9)	11.335	**0.010**
Secondary	8(9.2)	79(90.8)		
Tertiary	2(3.9)	49(96.1)		
Occupation				
none	19(20.9)	72(79.1)		
unskilled	6(8)	69(92)	10.024	**0.007**
skilled	2(4.3)	45(95.7)		
Relationship to child				
Biological parent	15(11.7)	113(88.3)		
Orphanage/shelter	2(6.1)	31(93.9)	0.889	0.528
Others	28(52.8)	25(47.2)		
Primary care giver on HAART				
yes	15(10.6)			
No	14(16.5)	118(89.4)	1.516	0.218
		65(85.3)		

4.6 Determinants of adherence

Table 4 found no statistical significance (P-Value >0.05) between the dependent variable (adherence) and the independent confounders which were caretaker's age, education and occupation.

Table 4: Multiple logistic regression

	B	S.E.	P-value	OR	95% C.I. for OR	
					Lower	Upper
Age of caretaker	-.021	.021	.301	.979	.940	1.019
Education of caretaker			.931			
None	-.852	1.694	.615	.426	.015	11.793
Primary	-.966	1.512	.523	.380	.020	7.368
Secondary	-.709	1.326	.593	.492	.037	6.620
Occupation of caretaker			.561			
Skilled	-.780	1.447	.590	.458	.027	7.817
Unskilled	-.037	1.329	.978	.964	.071	13.038
Constant	4.012	1.093	.000	55.240		

4.7 Reasons for Non-adherence to medication

Non-adherent caretakers cited for getting, scheduling of drugs, multiple care takers and stigma as most common reasons for non adherence. Table5

TABLE 5: Reasons for non adherence

FREQUENCY REASON FOR NON ADHERENCE	Never a problem 0	Hardly ever a problem (1-2 times per month) 1	Frequent problem (1-2 times per week) 2	Almost always a problem (3 times or more per week) 3
Taking herbal preparation	53 (92.7)	3 (5.5)	0	1 (1.8)
Run out of drugs	40 (72.7)	6 (10.9)	9 (16.4)	0
Taste/ spits	49 (89.1)	3 (5.5)	3 (5.5)	0
Forgetful	7 (12.7)	9 (16.4)	30 (54.5)	9 (16.4)
Causes physical side effects	51 (92.7)	3 (5.5)	1 (1.8)	0
Scheduling	13 (23.6)	9 (16.4)	32 (58.2)	1 (1.8)
Child refuses	29 (52.7)	12 (21.8)	7 (12.7)	7 (12.7)
Multiple caretakers	25 (45.5)	12 (21.8)	18 (32.7)	0
Sick with other illness	44 (80)	69 (10.9)	4 (7.3)	1 (1.8)
Concerns with disclosure	52 (94.5)	1 (1.8)	1 (1.8)	1 (1.8)
Away from home	48 (87.3)	3 (5.4)	4 (7.3)	0
Joined new religion	53 (96.4)	2 (3.6)	0	0
Hospital staff unfriendly	54 (98.2)	1 (1.8)	0	0
Stigma	29 (52.7)	2 (3.6)	10 (18.2)	14 (25.5)

CHAPTER FIVE : DISCUSSION

Our study set out to look at proportion of children who achieve above 95% adherence rate to antiretroviral drugs AIC Kijabe hospital, Kenya; we also sort to understand the

association of adherence with caretakers characteristics such as age, sex, education, occupation and primary care taker being on HAART as well as with child characteristics such as orphan status, age, sex, disclosure and who stage.

5.1. Adherence rate

In this study, 87.4% achieved ≥95% adherence which was better than the 70% initially reported from the same region by Wanjohi et al in Nyeri and 42% by Arika et al in Thika.Vreeman et al in a systematic review of studies in middle and low income countries found an average rate of 75%.

Similar high rates were observed in other African studies by Dachew et al[86] of Ethiopia in 2014 who randomly sampled 342 children, adherence was reported as 90.4% using the PACTG tool which utilizes the three day recall of measuring adherence and adherence rate was set at taking>95% of the doses.Dachwe et al[86] attributed this high rate to free provision of antiretroviral therapy and close monitoring of adherence by the facility. Dachwe et al utilized a similar PACTG tool to ours and used the three day recall method of assessment of adherence with a 95% optimal adherence rate which was similar to our study, similarly Dachwe et al randomly sampled his population and used a crossectional method of study. The difference is that dachwe sampled children 2 – 14 year while we sampled 1-14 years. Biadgling et al[71]in a study similar to ours randomly sampled 390 caretakers of children living with HIV, ages sampled were 3 months to14 years and reported adherence of 93% by a 7 day recall tool, Biadgling et al similarly sampled only caretakers and defined adherence as taking 95% doses, They differed from our study in that they did not assent children they utilized a different recall period to ours, and the age of the children sampled was different from our study. Davis et al[51] in a prospective cohort study of 112 children initiated on ART in Cape Town, South Africa,

reported average annual adherence of 80% with adherence described as medication return of <90% of the drugs. They reported that this could be due to assessment over a one-year period, which would have increased the odds of encountering non-adherence unlike our study which was cross sectional and our optimal adherence rate was set at <95%.

Lower rates have been reported by Arage et al[81], in 2014 they sampled 440 caretakers of children on ARVs 2-14 year, randomly picked, adherence in this study was 78.6% by 3, 7 and 1 month recall optimal adherence rate was set at 95% similar to our study Arage et al utilized a modified ACTG (AIDS Clinical Trial Group) follow up questionnaire, similarly adherence was described as optimal at 95%. Arage's study was different from ours in that they assented children who were disclosed and were above seven years; they used three different recall tools and took an average of the three methods whereas we used two subjective and one objective method but took the highest proportion of the three methods at 95% optimal adherence rate. Ugwu et al[84]using self-report by the caregiver/child in the past three, seven and one month, in a cross-sectional survey of HIV-infected children and adolescents on ART at University of Port Harcourt Teaching Hospital, Nigeria interviewed a total of 213 caregivers and their children the proportion of children that had attained adherence was 76.1%. Similar to our study Ugwe et al defined adherence as taking more than 95% of the doses in three, seven and one month.

Closer home lower rates have been noted by Wanjohi et al[14] in 2011 randomly sampled 300 caretakers of children on ARVS, 1-14 year, adherence of >95% was assessed using a 2 day recall tool and a visual analogue scale adherence amongst the children living with HIV in his multicenter study in central was 70%. The visual analogue scale used in Wanjohi's study was graduated similar to ours; unlike our study Wanjohi et al used a two day recall while we used a three day recall tool longer recall periods have been

reported to correlate well with objective measures of adherence[80,] Langat et al[87]conducted a cross sectional study in Kericho, Kenya in 2012. Unlike our study Langat et al used caregivers report on appointment and drug timing, pill count and appointment keeping and obtained an average adherence rate of 44.2%. Unlike our study we used caretakers report on 3 day recall of doses administered. Langat et al used consecutive sampling method which is prone to selection bias while we sampled by randomization. Earlier studies by Van Dyke et al[9] found lower levels of adherence at 70% over the last 3 days. Arrive et al[69] reported a rate of 67% in a study done in Cote d'Ivorie using the three day recall, though her frequently cited reason for non-adherence was drug stock out which could have resulted in the low adherence rate.

5.2. Determinants of adherence

Three caretaker variables were found not to be associated with adherence: caretaker's age, education level and occupation. Similarly Ugwe et al[84]of Nigeria found no association between the age of the caretaker and adherence. Arage et al[81] of Ethiopia found a negative association between education and adherence; care takers who had lower education status were more likely to adhere than those with higher education.Similar to our study we found negative association between adherence and education status but this could not be readily explained why. Iroha et al of Nigeria also found no association between care-takers' education and adherence and attributed it to the fact that her population was drawn from a rural area where majority of the caretakers had low levels of education unlike our sample which was drawn from both rural and urban setting.

Caretakers with skilled occupation were less likely to adhere than those with unskilled occupation, likely because busy work schedules lead to less care and attention of the

children. Iroha et al, Biadgling et al[71], Dachew et al found no association between occupation and adherence, likely due to their rural locations and majority of their study subjects having non-skilled occupation.

Studies elsewhere showed that complete disclosure to children by parents helps to motivate HIV infected children to adhere to their daily medical regimen. It enables children to understand HIV infection and to make sense of disease-related experiences and the importance of adherence[66, 67]. Starting with disclosure as early as 8–9 years of age and combining it with specific support is important to increase children's adherence as they get older[17]. In our study, however, disclosure had no significant relevance for adherence to the recommended regimen. It is consistent with other studies, which showed no effect of disclosure on adherence to Anti-retroviral therapy[7, 17, 65].The lack of association in our study could have been due to the intensive disclosure program that was underway for all children above 9years conducted by the children's caretakers guided by the health workers for one year prior to initiation of this study at AIC Kijabe hospital.

Child characteristics such as orphan status, age and sex were not found to be associated with adherence to treatment in our population. Similarly Nyandiko et al[28] found no association between orphan status and CD4% and concluded that orphan status was not associated with worse short term outcome, though there is need for studies to assess long term outcome[28].In our study age of the child had no association with adherence. Dachew et al of Ethiopia found significant association between an increase in child's age with decrease in adherence and attributed it to caregivers giving less care and more responsibility to older children[86].

Caretakers of the children who were non-adherent to antiretroviral therapy cited forgetting; this could be due to the care takers being busy with their daily routine. Similarly Langat et al[87],Arage et al[81],Arrive et al[69] and Ostenberg et al[64]sited forgetting as one of the main reasons for non-adherence. Iroha et al[70]of Nigeria reported that the low incidence of forgetting in her study could not be readily explained, especially considering that only about 30% of the caregivers reported using medication reminders, and that the use of reminders was not associated with adherence to medication. In tandem with several other studies such as Paterson et al[60] and Gibb et al[65], stigma, a change in daily routine like multiple care takers, or difficulty incorporating drug administration into one's lifestyle, and child refusal were common reasons for non-adherence in our study.

CHAPTER SIX : CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions:

- Adherence to antiretroviral drugs at AIC Kijabe hospital was high than the low and middle income countries average.
- Child characteristics' and care givers characteristics had no association with adherence.

- Majority of the children had been disclosed to their status.
- And cited forgetting, scheduling multiple caretakers' and stigma as deterrents to adherence

6.2 Recommendations:

- We recommend clinicians and caretakers to encourage disclosure for children on antiretroviral drugs in order to optimize adherence to antiretroviral drugs.

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APPENDICES

APPENDIX I: INFORMED CONSENT FORM

English

Study no: _____

Determinants of Adherence to Antiretroviral Treatment among HIV-Positive Children Attending the AIC Kijabe Hospital.

Invitation to Participate

You are invited to participate in this research study investigating determinants of adherence to antiretroviral treatment among HIV-positive children attending the AIC Kijabe Hospital.

Basis for Subject Selection

You are eligible to participate in this study because you were randomly selected in-order for us to understand the problems facing caretakers when administering antiretroviral drugs to their child. You will be one of approximately 214 other caretakers to participate in this study.

Purpose of Study

The main purpose of this study is to determine factors enhance or deter adherence. Another purpose is to assess the proportion of children who are adherent

Procedures

You will be asked to answer questions regarding how you administer the antiretroviral drugs to your child.

Potential Risks

There are minimal perceivable risks associated with your involvement in this research study.

Potential Benefits

There is no reward or gift for involvement in this study though the potential benefits to you for participating in this research study are that you will have contributed to better understanding of the factors that determine adherence.

Guarantee of Confidentiality

To ensure confidentiality, at no time will your name or your child's name appear on any materials or reports of the research findings (including web-site postings of the results, conference presentations, or professional publications). Materials associated with this study will be kept under lock and key in a cabinet. Your signed consent form will be stored separately from your data to insure complete confidentiality. At the conclusion of this study, all materials will be destroyed.

Withdrawal from Participation

Participation in this study is voluntary. Your decision to participate or not to participate will not affect your child's follow up at the Aids Relief clinic if you decide to participate; you are free to withdraw your consent and to discontinue your participation at any time with impunity.

Offer to Answer Any Questions

If you have any questions about the procedures at any time, please do not hesitate to ask.

If you think of questions later, please feel free to contact the principal investigator. All questions about the procedures and this study in general will be answered. However, some questions may not be able to be answered until after you have completed the procedures to insure that your responses will not be affected by your knowledge of the research.

Participant's Statement

I am voluntarily making the decision to participate and I am the primary caregiver of this child. My signature certifies that I have heard and understand the aforementioned information. My signature also certifies that I have had an adequate opportunity to discuss this study with the research investigator and have had all of my questions answered to my satisfaction. I understand that by signing this document, I waive no legal rights.

_____ _____

Caretaker's Signature Date

Research Investigator's Statement

In my judgment, the aforementioned participant is voluntarily and knowingly givinginformed consent and possesses the legal capacity to do so.

_____

Research Investigator's Printed Name

_____ _____

Research Investigator's Signature and Date

0721-310018, P.O BOX 12024 NAKURU, dr.mugambijoy@gmail.com

Research Investigator's Telephone Number Research Investigator's E-mail Address

APPENDIX II: FOMU YA RIDHAA

KIAMBATISHOII (Kiswahili

VigezoyakufuatatibayakupunguzamakaliMiongonimwawatotowenyeUkimwiwanaohudhuriaKlinikiya AIC Kijabe Hospital.

Mwalikowakushiriki

UnaalikwakushirikikatikautafitiwakuchunguzavigezokufuatatibayakupunguzamakalikatiyawatotowenyeUkimwiwanaohudhuriaKlinikiya AIC KijabeHospitali.
MsingikwaajiliyaUchaguzi Subject
Unastahikikushirikikatikautafitihuukwasababuulikuwazilizochaguliwakwanasibukatika-ilinasisikuelewamatatizo yanayowakabili walezi unapotoamadawayakupunguzamakaliyawatotowao. Wewekuwamojaya takriban 214 yawaleziwenginekushirikikatikautafitihuu

Madhumuniyasomo

Lengokuu la utafitihuunikuamua mambo kuboresha au kuzuiakuzingatia. Lengo linguine nikufanyatathminiyaidadiyawatotoambao wanafuata maagizo wa hizi madawa.

Taratibu

Utaulizwakujibumaswalikuhusujinsiyakusimamiamadawayakupunguza makali ya ukimwi kwa mtotowako.

Hatarizautafiti

Kuna uwezowahatarindogo.
Hatarizinazohusiananaushirikiwakokatikautafitihuunikuwamtotoyakohuendaakajuahaliyake ya ukimwi kamabadohaujafichua.

FaidaHakunamalipo au zawadikwaajiliyakushirikikatikautafitihuu.
Ingawafaidayawewekushirikikatikautafitihuunikwambakutakuwanamchango bora kwakuelewekakwasababuyakuwanakuamuakufuata .

Dhamana ya Usiri Kuhakikisha siri, wakati hakuna jina lako au jina la mtoto wako kuonekana kwenye nyenzo yoyote au taarifa ya matokeo ya utafiti (ikiwa ni pamoja na mtandao matangazo ya matokeo, maonyesho ya mkutano huo, au machapisho ya kitaaluma). Vifaa yanayohusiana na utafiti huu kuwekwa chini ya kufuli na ufunguo katika baraza la mawaziri. Saini fomu ya idhini yako itahifadhiwa tofauti na data zako kwa kuhakikisha siri kamili. Katika hitimisho la utafiti huu, vifaa vyote ataangamizwa

Kurudishwa kutoka Kushiriki Kushiriki katika utafiti huu ni wa hiari. Uamuzi wako wa kushiriki au kutoshiriki wala kuathiri mtoto wako kufuatilia katika kliniki ya Relief Ukimwi Kama kuamua kushiriki, uko huru kutoa idhini yako na kuacha ushiriki yako wakati wowote na hali ya kutokujali.

Kutoa na kujibu maswali yoyote Kama una maswali kuhusu taratibu wakati wowote, tafadhali usisite kuuliza. Kama unafikiri ya maswali baadaye, tafadhali jisikie huru kuwasiliana mpelelezi mkuu. Maswali yote juu ya taratibu na utafiti huu kwa ujumla yatajibiwa. Hata hivyo, baadhi ya maswali ya kuwa na uwezo kwa kuwa akajibu mpaka baada ya kukamilisha taratibu za kuhakikisha kwamba majibu yako si walioathirika na maarifa yako ya utafiti.

Mshiriki Statement Mimi ni hiari ya kufanya uamuzi wa kushiriki na mimi Mlezi ya msingi ya mtoto huyu. Saini yangu certifies kwamba nimesikia na kuelewa habari aforementioned. Saini yangu pia certifies kwamba mimi kuwa na nafasi ya kutosha kujadili utafiti huu na uchunguzi wa utafiti na kuwa na maswali yote yangu akajibu kwa faraja yangu. Ninaelewa kwamba kwa kusaini hati hii, mimi kuondolea hakuna haki ya kisheria.

_____ _____

Sahihi ya mzazi na tarehe

Mpelelezi wa utafiti

Katika hukumu yangu, mshiriki aliyetajwa ame hiari na wanajua kutoa ridhaa na ana uwezo wa kisheria wa kufanya hivyo.

_____

Jina la Mpelelezi wa Utafiti

_____ _____

Sahihi ya Mpelelezi wa utafiti na tarehe

0721-310018, P.O BOX 12024 NAKURU, dr.mugambijoy@gmail.com

Simu ya Mpelelezi wa utafiti, anwani ya Mpelelezi wa Utafiti, na E-mail Address

APPENDIX III (KIKUYU)GWITIKIRA

Clinic no:_____

Gukoruouriumwewamaratwiriamaundumariamagiragiakunywadawaciamurimuwamuki ngo (HIV) kwichiana.

Mwaliko

Gitumigiagutwiragukunakugeriakumenyamaudumariamatumagachianaitaikanywedawa uraihatikunyarira marina mukingonamadomariamagiragiaachiarikuhe chiana ciao dawaoriaihati. Uchagurirwekibahatinanikugakorwanaaciari 214 kwikithomagiki.

Maana ma kithomo

Maana ja kithomagikinikumenyamaundomaryamatumagaachiarimatikahotekuheechianadawanam audomaryamatomagaachiarimahotekuhechianadawa. Udounginikumenyanichiana chigana chi tugatagia kunwa kwa dawa.

MitarataraNukurwachioriauriuheagamwanadawa. Na mathinamariamakoragwaukiheanadawakwaimwana.

Thinaciakithomo

No kuhotegukoronathinanini mono. Ta mwanakumenyathinayakeyakurwaranimukingo. Lakinayakoronitukutithiririana counselling yamwana.

Faida

Gutirimbecha kana ihewachikaheanwokwa aria makatugaterwo. Lakinikithomokyathiranikikufaidia Kenya othe.

Hitho

Maodomariamekumenyekakamatikwariocararuku, nimegukoruo me ma hitho.

Maondomariamakamenyekakwikithomogikimatikoronaritwariku kana ria mwana.

Maratatimaria tukotumirathutawa kithomo ni ma kutinwanakuithwa.

Kurutwo kuma kithomo

Kuigira kwikithomo ni kucirutira. Gutiri lasma na waigwa utikwenda kuigira ni ukuhewa dawa na kutungaterwa ta kawaida kwi klinik ya Aids relief kijabe

Kuchokia chioria

Gwakorwa wina chioria chia kithomo, ni wega kuria. Gwakorwo wina chioria thutha wa kithoma nouhote kuria dakitari wa kithoma gikii. No kuhota chioria ingi itigochowa mbere ya kithomo kenda uti kakorwe na utaririo wa kithomo.

Kugo kya muchiari
Ni muchiariwamwananidanyitawegauhorowagithomogiki, naninidahitikiragwikauu. Kiroregyakwaanikiwaonanianidanyitauhorourindatarirwa. Na nidachokerwachioriachiothewega mono.

_____ _____
kirore kya muchiari na tariki
dakitari wa kithomo
kwiwereo wakwa. Muchiari niaheana rutha an ina akiri njega. Ni akinyiti myaka ya kuhitikira kuheana rutha.

_____
dakitari wa kithomo

_____ _____
kirore kya dakitari na tariki

0721-310018, P.O BOX 12024 NAKURU, dr.mugambijoy@gmail.com
thimu, number ya box na email adress ya dakitari wa kithomo.

APPENDIX IV: PAEDIATRIC ADHERENCE QUESTIONNAIRE

Protocol | | | | Number

WHO Stage _____ CD4 count _____

Age of child _____ Sex of child _____

Sex of caretaker _____ Age of caretaker_____

QUESTIONS 1 - 9 ARE TO BE COMPLETED BY THE STUDY CLINICIAN:

1. **1.Education level Of the child's parent or guardian**

   a. None ☐

   b. primary ☐

   c. secondary ☐

   d. tertiary ☐

2. **Occupation of child's primary caretaker**

   a. Unskilled ☐

   b. skilled ☐

   c. Professional ☐

   d. Student ☐

3. **What is the primary care givers relationship to the child?**

   a. Biological parent ☐

   b. Orphanage/shelter ☐

c. Other relative, specify ☐

specify below:

_____

_____

4. Who is responsible for administering the medications?

1-Primary caregiver ☐

2-Study participant ☐

3-Other, specify ☐

If other,

specify:_____

_____

5. Is the primary caregiver on HAART?

☐

1-Yes

2-No ☐

3-unknown ☐

6. Has disclosure to the child been done?

☐

1-Yes

2-No ☐

3-unknown ☐

7. What is your opinion regarding ART therapy

1) Approve ☐

(2) Disagree ☐

(3) Undecided ☐

9. Do you think that ARV have a positive effect on your child's health?

No, ☐ ☐ Yes

10. What benefits have you gained from using ARV drugs

(1) Gained more weight/energy ☐

(2) No more frequent sickness ☐

(3) Non ☐

11. Since the last visit, did the study participant or primary caregiver utilize any of the aids for improving adherence?

1-Yes ☐

2-No ☐

If No, go to question 12.

If Yes, answer 'Yes', 'No' or 'Not known' to each of the following and continue.

(1-Yes, 2-No, 3-Not known)

a. Labels:

……

b. Calendars:

……

c. Pill boxes:

……

d. phone:

……

e. Monitoring caps (MEMS):

……

f. Timers:

……

g. Programmable wrist watches:

……

h. Diary:

……

i. “Buddy system”:

……

j. PEG/gastrostomy

tube.....

k. Other, specify:

……

12. MEDICATION LIST TABLE:

[1] Identification Codes 1-Volunteered without prompt 2-Volunteered with prompt 3-Acknowledged when reminded 4-Did not acknowledge				[2] Dose Enter “-1” if study participant/primary caregiver Enter“0” if no doses were missed.
Complete Prior to Visit				**Completed**
A	**B**	**C**	**D**	**E**
Drug name	**Drug code**	**Drug colour, type (tabs/syrup)**	**Expected # doses or weight of syrup**	**I Code[1]**

13. FOR QUESTIONS 13a - 13n: Indicate the frequency with which each listed reason for non adherence occurs. This needs to be done for each antiretroviral drug the study participant is taking. Use the following codes:

Frequency Codes:

0-Never a problem

1-Hardly ever a problem (1-2 times per month)

2-Frequent problem (1-2 times per week)

3-Almost always a problem (3 times per week)

Drug (enter code)			
a. stopped because child was taking herbal preparations (visits to Loliondo)			
b. Didn't refill; ran out			
c. Taste, can't get it down, spits up, amount (pills or liquid)			
d. Forgot			
e. Caused physical effects (rash, pain, headache, etc.)			
f. Scheduling – interferes with lifestyle (meals, school, and sleep)			
g. Child refuses			
h. Multiple caretakers			
i. Concerns about disclosure			
j. Sick with other illness			
k. Doesn't remember/not sure if dose was taken			
l. Fell asleep			
m. Away from home			
n. joined a new religion child got healed			
o. the hospital staff were unfriendly			
p. afraid of stigma from society			
n. Other, specify			

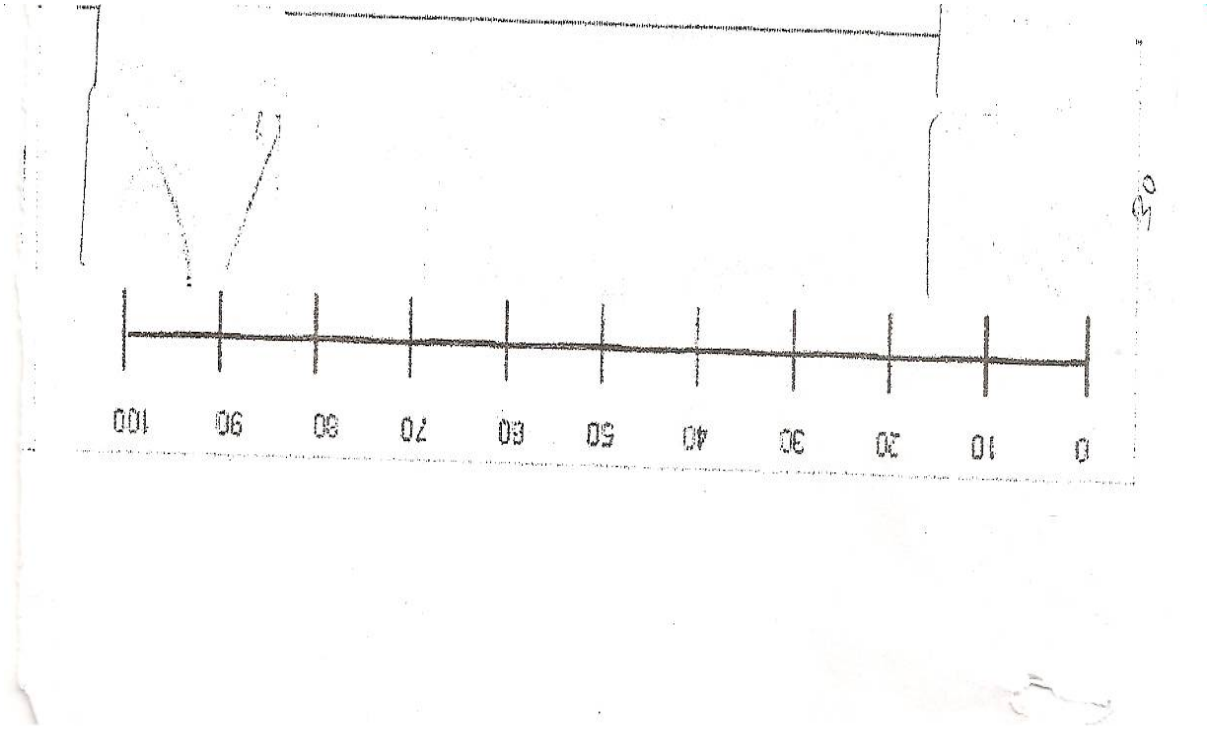
_____

_____

Thank the participant.

Date Form Keyed (DO NOT KEY for data entry): _____ /_

Appendix V: Visual analogue scale



Appendix VI: Ethical approval

AIC Kijabe hospital's research and ethics committee approval email.

Helen Kimemia **<hivresearch.kh@kijabe.net>** 2/14/11

to me

Dear Dr. Mugambi,
I have the pleasure to congratulate you upon the approval of your research protocol, "Determinants of adherence to Anti Retroviral Therapy among HIV positive children attending the AIC Kijabe hospital".
However, be informed that several amendments need to be done on your proposal as you commence this study:

1. Clearly spell out risks and benefits to the participant

2. Revise the study limitations (there are more than bias)

3. Methodology should be clear – exactly who are you interviewing – the child or the parents/guardian

4. The consent translation needs to be fully done in Kiswahili (there are English words on it)

5. Did you have more operational words (apart from child and adherence) that need to be defined?

Please email the corrected version and your responses to me and copy Dr. Achieng.

All the best,
Helen.

"if we knew what it was we were doing, it would not be called research, would it?" (Albert Einstein)