

**UPTAKE OF REPEAT HIV TESTING DURING PREGNANCY, LABOUR AND POST
NATAL PERIOD FOLLOWING AN INITIAL NEGATIVE RESULT IN PREGNANCY
IN KISUMU COUNTY**

DR. MOLLA ADELENE APONDI LOLLAH

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DEPARTMENT OF PAEDIATRICS AND CHILDHEALTH

SUPERVISORS:

PROF DALTON WAMALWA

PROF WAFULA EZEKIEL

PROF NDUATI RUTH

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University of Nairobi

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DECLARATION

I the undersigned, declare that this thesis is my original work. It has not been presented to any other university, college or institution or academic forum for the purpose of academic credit.

Candidate: Dr. Molla Adeline Apondi Lollah, MBChB

Department of pediatrics and child Health, University of Nairobi.

Signed..... Date.....

This dissertation has been presented with our approval as supervisors:

Prof. Nduati Ruth W.

MBChB, MMed (Paed), MPH, Fellow of Primary Health Care, Cert Tropical medicine

Professor, Department of Paediatrics and Child Health, University of Nairobi.

Signed..... Date.....

Prof. Dalton Wamalwa, MBChB, MMed(paeds), MPH

Associate Professor of Paediatrics and Child Health

Department of Paediatrics and Child Health, University of Nairobi

Signed..... Date.....

Prof. Wafula , MBChB, Med,(paeds), MPH

Professor of Paediatrics and Child Health

Department of Paediatrics and Child Health, University of Nairobi.

Signed..... Date.....

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LIST OF ABBREVIATIONS

ANC	Antenatal care
ASCH	Ahero Sub-County Hospital
ART	Antiretroviral Therapy
CCC	Comprehensive Care Clinic
CDC	Centre for Disease Control and Prevention
CD4	Cluster of Differentiation 4
CMI	Cell Mediated Immunity
FGDs	Focused Group Discussion
HIV	Human Immunodeficiency Virus
KAIS	Kenya AIDS Indicator Survey
KCH	Kisumu County Hospital
KNH	Kenyatta National Hospital
MOH	Ministry of Health
NASCOP	National AIDS& STI Control Program
PI	Primary Investigator
PLWHIV	People Living with HIV
PMTCT	Prevention of Mother to Child Transmission
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
STI	Sexually Transmitted Infections
UK	United Kingdom
US	United States
UNAIDS	United Nations Program on HIV/AIDS
WHO	World Health Organization.

DEFINITION OF TERMS

Initial test: The very first HIV test done to the mother during the index pregnancy.

HIV result: Documented HIV result by healthcare worker, this can be on the mother and child booklet or any medical health records book or form used by the mother.

Repeat test: HIV test done following the initial test. The definition is further egged on NASCOP guidelines 2015.

ABSTRACT

Background: Young women represent the population with the fastest increase in HIV infection, with more than 60% of all new infections occurring in them with Mother to child transmission (MTCT) responsible for over 90% of pediatric HIV (3,4). Over the years, significant gains have been made in the PMTCT, with reduction in rates to less than 6% and a reduction in levels of transmission of new infections by 50% (4, 5).

Repeat HIV testing in late pregnancy has the potential to reduce MTCT rates by identifying mothers who seroconvert after having tested negative for HIV earlier in pregnancy (8, 9) and this strategy is now incorporated into the Kenya PMTCT program.

Currently there is little evidence to the uptake of the guidelines on repeat testing during the pregnancy and immediate post-partum period.

Objective: The aim of the study was to determine the uptake of repeat HIV testing services after an initial negative result in pregnancy, labor and the 6 weeks' post-natal period in Kisumu County and to identify the barriers to uptake of the HIV retesting guidelines.

Methodology: A combined quantitative and qualitative aspects was utilized: a cross sectional among women who had tested HIV negative at the initial ANC visit and were attending the 6week immunization clinic were consecutively sampled, and after obtaining informed consent, were interviewed using a standard tool to collect information on social demographic characteristics and whether they had accessed a repeat HIV test. Secondary and a qualitative aspect that involved focus group discussion with the healthcare workers at the MCH clinic and key informant interview with the clinic heads and program directors. Data was then entered and analyzed using SPSS for any associations and correlations. Qualitative data was recorded and analyzed using qualitative tools SDQ.

Results:

380 mothers attending MCH clinic for routine child immunization at 3 health facilities in Kisumu County were interviewed. The median age was 25 [IQR 21-31] with majority of the women having had at least some form of education. Almost two thirds of the women 243 (64.3%) were married, however of these 22.3% had their husbands staying away from home and only 47.3% were aware of the HIV status of their partners. Most women 372 (97.9%) had a HIV

test done during their first visit at the ANC which happened on average at 7 months of pregnancy. The retesting rate was 68.4 %($p < 0.0001$) and the factors that were significant in determining retesting rate after multivariate analysis included the age of the mother and the time of initiation of the first ANC visit. Women who attended ANC earlier were more likely to accept repeat HIV testing than those who came later (6.3 weeks vs 11.7 weeks, $p < 0.0001$). Older women were likely to take up repeat testing (OR 0.9 [95% CI of OR 0.8 - 0.9], $p = 0.046$). In the qualitative arm of the study across the three facilities, the age of the mother and the time of initiating ANC visits were among the patient factors that were important in determining the uptake of the repeat testing services and thus was collaborative with the quantitative study.

Conclusion;

According to our study Initial HIV testing rates were high at 97.4%, mothers were willing to have repeat tests done. Awareness of the need to have repeat HIV testing affected the retesting rates. The average retesting rate was higher than the National rates at 68.4%. Independent predictors of up-take of re-testing was older age, and earlier initiation of antenatal care.

Recommendations:

Increase awareness on the need to have HIV testing and emphasis to be made on repeat HIV testing.

Trainings and Continuous Education on key areas like PMTCT.

Government involvement of Counties in the implementation of national guidelines.

CHAPTER ONE: INTRODUCTION

1.1 Background

HIV has remained a challenge globally however the magnitude is worse in developing countries. Heterosexual sexual relationships accounts for most of the transmission however, in pediatrics most occur through mother to child transmission (5, 6, 8) and thus mother to child transmission of HIV remains significant, and are more amenable to interventions aimed at reducing the transmission cycle. Different efforts have been put in place with the most recent ones aiming at early identification, treatment and viral control (1). In view of the increased risk of acquisition of HIV among pregnant women (2) (3), evidence based guidelines have been proposed to conduct repeat testing for pregnant women who test negative during their initial HIV test earlier in pregnancy.

1.2 Epidemiology

HIV infection and AIDS has remained a global pandemic with cases being reported from virtually every country (4). Global HIV incidence reached its peak in 1997 at 3.3 million new infections. (4,6). The annual incidence has stayed relatively constant at about 2.6 million per year (2.5-2.8) since 2005 after a period of rapid decline between 1997 and 2005. The number of PLWH has been relatively increasing and reached 38.8 million in 2015 (5). HIV/AIDS mortality has been declining since at a steady state due to the initiation of ART programs (5).

The HIV pandemic has occurred in waves and there exists substantial heterogeneity in the margins and trends across countries. Different regions in the world have different characteristics depending on the demographics with Sub-Saharan Africa accounting for 2/3 of the number of new infections and of these more than 10% are among the adult population 15-49 years.(1,4,6).

According to the Kenya Aids Indicator Survey 2012 (5), prevalence of HIV in Kenya stands at 6% among Kenyans aged between 15-64 years a value that is significantly lower than the HIV prevalence estimate in 2007 reported at 7.2%. Women aged 15-64 years had higher prevalence (6.9%) than their male counterparts (4.4%) and young women aged 20-24 years were at least three times more likely to be infected than young men of the same age group.

Regionally within Kenya there also exists significant differences in HIV prevalence with the highest being observed in the former Nyanza province at 15.1% and the lowest in Eastern at 2.1%. Sustained action is thus needed to achieve the United Nations recommended goals of 90% HIV testing, 90% ART initiation for those who test HIV positive and 90% viral load suppression for those who have been initiated on ART by the year 2020. This is aimed at reducing the overall circulating virus within the population, reduction in the number of new infections and subsequent elimination.

1.3 Mother to child transmission.

There has been an increase in the number of new infections among the reproductive age group (5) (6) and in this group it was noted that Women of reproductive age were more likely to be affected with HIV than their male counterparts (5). Moreover, the chances of getting infected are even higher among pregnant women.

There are over 216,000 (7) sero-discordant couples and thus there is a further increase in the chances of getting infected (8).

MTCT accounts for 90% of pediatric HIV. The PMTCT rate is currently at 8000 per year and with over 216,000 sero-discordant couples this implies that there are increased chances of newer infections occurring during pregnancy and the postpartum period. Despite high levels of testing in antenatal setting there is still a subset of women who acquire HIV during this period and whose infants are at high risk of HIV acquisition due to the elevated viral load associated with acute infections. (11) (14).

The gap as identified by Njuguna et al in Kenya (19), looked at the missed opportunities in HIV prevention among children in KNH and in Kisumu and found out that 45.7% mothers who had previously tested HIV negative in the initial visit had no repeat tests.

Repeat HIV testing in late pregnancy therefore has the potential to decrease rates of mother-to child transmission by identifying mothers who seroconvert after having tested negative for HIV in early pregnancy and initiating them on ART (9). Despite this being a national policy in most countries, there is lack of data on the implementation of repeat testing in Sub-Saharan Africa.

In Zambia, an observational study conducted looking at the awareness among mothers on repeat HIV testing among women attending 6 weeks immunization for their children reported that 72% were aware of the importance of repeat testing however, only 36% had received the repeat tests.(9).

Gachuno et al looked at the implementation of guidelines in regards to ART initiation at ANC clinics in KNH and Pumwani Hospital and noted that the guidelines were not being followed with erratic implementation in the various service delivery points in the department.(20).

The Joint United Nations Program on HIV/AIDS (UNAIDS) identified 22 countries (Kenya being one of the countries) that account for over 90% of all MTCT for more focused interventions. By the year 2012 only seven had achieved testing rates of over 90% of all pregnant women while 14 had achieved at least 50%. In Kenya, there have been several strategies rolled out to ensure increased uptake of PMTCT services (8) but there is still a gap(19) and thus the need to do an evaluation and advise accordingly.

This study aimed at understanding the barriers to uptake of repeat HIV testing services in the mothers who had an initial negative and help understand why the gap stands at 45.7%(19).

CHAPTER TWO: LITERATURE REVIEW

2.1 Acquisition of HIV during pregnancy

According to KAIS 2012, the HIV prevalence was higher among women (6.9%) than among men (4.4%). In particular, young women aged 20-24 years were over three times more likely to be infected (4.6%) than young men of the same age group (1.3%) this therefore indicates that the women are more likely to be affected than the men in the same age group and women in the reproductive age being more vulnerable.

A serial cross sectional survey and prospective study done in Malawi for data between 1985-1995 showed an increase in HIV sero conversion from 20% in 1985 to 32.8% in 1996 which was a sixteen-fold increase. The Highest prevalence was in 20-24 years and a linear increase in HIV prevalence amongst antenatal mothers that rose from 20 in 1985 to 25.9 %in 1991. Hoover et al in Malawi, carried out an observational study that showed that the rates of HIV acquisition were significantly higher during pregnancy than the postpartum period (10).The findings were a 2.19 fold higher rates of HIV incidence during pregnancy (incidence rate 7.9 per person years) compared to Non-pregnant population. (10). Investigators in Rwanda also reported higher HIV incidence rates during early postpartum period than at later time remote from puerperium indicating seroconversion during pregnancy. (7).

A prospective cohort study done in Rakai Uganda showed that there is an increased rate of acquisition of HIV during pregnancy and this was mainly because of the role of different hormones on the female genitalia and the immunological factors which increase the susceptibility to HIV infection (3).

A prospective study done by Roongy et al at Siriraj Hospital Mahidol in Bangkok Thailand found an increase in the percentage of women who sero-converted during pregnancy from 1.4% to 2.1%.

Qolonie et al in Durban South Africa retested women who had initially tested negative for HIV during their earlier gestation and they found 2.2% HIV sero-conversion rate.

In Rakai, Uganda (2), a prospective cohort study showed that there is increased acquisition of HIV infection during pregnancy.

In a prospective study done by Ambuchi in Kenya, at the KNH, 4 out of the 500 women receiving obstetric services at KNH sero-converted during pregnancy (18); this translate into a transmission rate of 0.8%.

Kinuthia et al (11) did a retrospective study- co-factors for HIV-1 incidence during pregnancy and post-partum period' looked at 2,153 mothers who were negative during their 6 weeks child immunization clinics, 2,035 (95.3%) accepted retesting and of these 53(2.6%)were HIV seropositive yielding an estimated HIV-1 incidence of 6.8(95% CI 5.1-8.8) per 100 women-years.

2.2 Mother to child transmission of HIV

A child can acquire the HIV virus from the infected mother and without any intervention an infected woman has 15% (non-breast feeding) to 50% (breastfeeding population) cumulative chance of transmitting the virus to the baby (3,8,12). PMTCT was implemented in Kenya in 2000 and has undergone substantial scale up since 2003 (5). Nearly 10,000 health facilities offer PMTCT intervention (2010) (8). A total of 95.4% of women between the ages of 15-54 years who were pregnant between 2008 and 2010 were reported to be attending ANC at least once during their pregnancy.

2.3 HIV retesting in pregnancy

While this is encouraging, a recent meta-analysis found the pooled cumulative incidence of new HIV infections during pregnancy and postpartum period in African countries to be 3.6% (95CI:1.9-5.3) suggesting that a single antenatal test may fail to capture an important subset of women who acquire the infection during this time and whose infants are at high risk of HIV acquisition due to elevated viral loads associated with acute infections (9,13). Additionally, as women with prevalent infection are increasingly identified at the first antenatal visit, it is estimated that 34%of all MTCT in the future will be among women with acute infection at their first antenatal care (ANC) clinic visit.

In the latest recommendations released by WHO that were adopted by Kenya in June 2016, retesting in late pregnancy is strongly recommended as a practice that will help in the elimination

of MTCT of HIV. In Kenya, repeat HIV testing in the ANC setting, defined as retesting three months after the initial presentation in the antenatal clinic, is a national policy.

<p>NASCOP GUIDELINES 2015</p>	<ul style="list-style-type: none"> ▪ All pregnant women of unknown status to be tested at first visit ▪ Repeat HIV testing (after 3 months) in the 3rd trimester should be offered to all women whose 1st ANC test was performed before 28weeks ▪ Women who decline to be counseled and offered HIV testing will be encouraged for a repeat counseling and testing at the next encounter ▪ Those presenting in labor without documented HIV testing should have opt-out testing done urgently ▪ Post-natal testing to all women with unknown HIV status ▪ Testing should be offered at all hours of operation
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Although more than 90% of pregnant women in Kenya receive an initial HIV test (89.2% 2009 and 94.4% 2012.) and research suggests that retesting acceptability is high, Kinuthia et al (11) cofactors for HIV 1 incidence during pregnancy and post-partum period, current rates of retesting among pregnant women are unknown.

An observational study conducted in Zambia looking at the awareness among mothers on repeat HIV testing looked at 404 women attending the routine 6 weeks' immunization for their children. They reported that about 72% of the women were aware of the importance of repeat testing but only 36% overall had received a repeat test in the antenatal period. Awareness was significantly associated with repeat testing(odds ratio .8:95%CI 2.9-6.9) (9).

The Gap:

A study conducted by Njuguna et-al in Kenya(19), to identify missed opportunities in HIV prevention, diagnosis and linkage to care, looked at hospitalized HIV –infected, ART naïve Kenyan children in centers in Nairobi and Kisumu. 183 children were reviewed to find out PMTCT review, hospitalization and HIV testing history. They found out that most mothers had received HIV testing during pregnancy (77%), and among the mothers tested 60%were HIV negative and 40%were HIV positive. Of those who tested positive 33% did not receive PMTCT ART. The first missed opportunity for pediatric diagnosis and linkage was failure to test the mothers at 23% and maternal HIV acquisition following an initial negative result at 45.7% .it is this gap of 45.7%that informs the study. (16)

2.4 Guidelines and implementation:

Studies done from the US and UK looking at the cost effectiveness of performing two HIV tests the first being in the early gestation and the second at the middle of the 3rd trimester have all shown that it is cost effective to do these two tests as opposed to the cost incurred in managing children infected by their mothers during the antenatal period or immediate post-partum (14–16).There were also long term implications on the economy of the country. The recommendations from the above studies (14–16) were that in high prevalence areas with high infection rates more than 1000 persons per year, a second HIV test is worthwhile. Several studies have been done on the barriers to initial HIV testing across the continent with factors such as stigma, lack of information, poor relations with healthcare workers, lack of privacy, the fear of turning out to be positive among others however, the barriers and enablers to repeat HIV testing among pregnant women who have already accepted HI V testing once are less clear and thus the need to address these gaps in the literature.

Gachuno et al looked at the implementation of guidelines in regards to ART initiation at the ANC clinics in KNH and Pumwani Hospital and noted that the guidelines were not being followed with erratic implementation in the various service delivery points in the department. (20).

2.5 Barriers to uptake of second HIV testing

A qualitative analysis by Rogen Weke et al did a 20- in depth semi-structured interviews with healthcare providers and managers to explore the barriers and enablers to implementation of repeat HIV testing guidelines among pregnant women in Kisumu County (17) found several factors that were facilitators and barriers to the uptake of the repeat testing guideline. These factors are composite in nature, with some involving the mothers themselves, the healthcare givers or workers, the society and more importantly the health care systems. No single factor has been noted to replicate across the board and this is basically due to the differences in the various approaches to the subject, diverse cultures and the different approaches by various HIV programs across the African continent. Some of the factors that have been linked to reduce uptake of the testing are discussed below:

2.5.1 Client factors

These were further subdivided into:

- a) Factors influencing late initial presentation for ANC
- b) The decision not to attend ANC at all.

According to Rogen et al (17) the factors that were attributed to late initial presentation included maternal age, level of education, distance and financial constraints, initial negative result whereas those attributed to the decision not to attend ANC at all were ,long queues, migration or travel away from the primary health facility for social or economic reasons, preference for community based services by Traditional Birth Attendants (TBA) after the reassurance that the initial status of the pregnancy is safe and influence from the male partner.

2.5.2 Facility level barriers

These refer to health care provider factors which included heavy workload, understaffing and lack of testing materials, lack of awareness on the importance of testing and facility level factors such as space limitations, inconsistent testing kit supply and the registers and MOH booklet design. There were several registers that were being used in the various facilities and were located at various places. The HIV register was arranged in a longitudinal basis with each entry made per day, to trace the information for a patient thus required looking through the various pages so as to update, and thus use of electronic entry with special identifiers was thought to help ease the data management.

The MOH booklet was designed for a single entry test and thus most workers tend to fill the 1st test more than the second test as there is no provision for it or to fill in other books or pages.

2.6 Conceptual Framework: Barriers to uptake of HIV retesting services

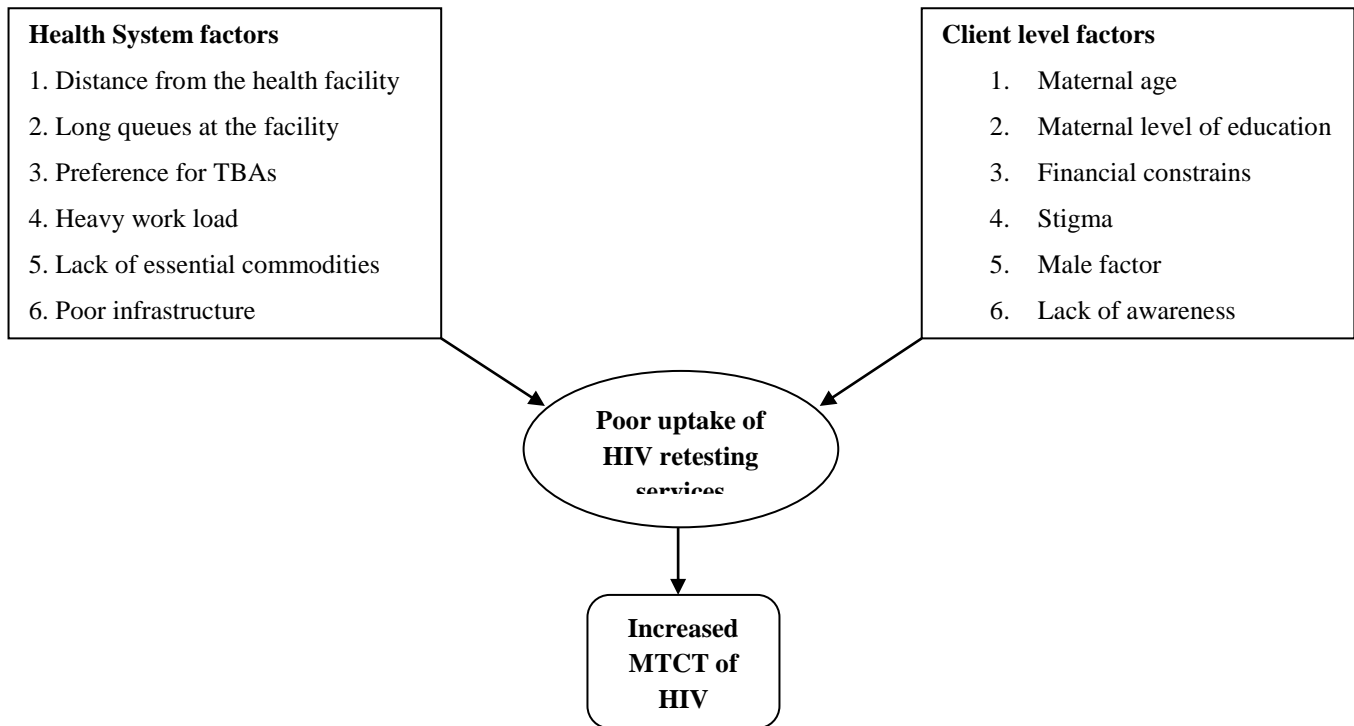


Figure 1: Barriers to utilization of retesting services

2.7 Study Justification and utility:

HIV has remained a global problem with over 39.5 Million people living with the disease and majority of whom are women especially those in the reproductive age group. Mother to child transmission of HIV accounts for 90% of paediatric infections. The number of serodiscordant couples in Kenya is estimated to be over 260,000 and this means there exists a chance of transmission of the disease. Repeat HIV testing has potential to reduce MTCT by identifying mothers who seroconvert after having tested negative for HIV earlier in pregnancy. Despite there being guidelines on repeat HIV testing in pregnancy, labor and postnatal period, we still have a gap at 45% (19). The study aimed at identifying the uptake of these guidelines and the barriers so as to ensure improved uptake and informing strategies to reduce the barriers. Kisumu County was chosen because of increased burden of disease in the region and three facilities selected to cover different Sub-counties in the region.

2.8 Research question

1. What is the uptake of repeat HIV testing following an initial negative test during the antenatal, labor and postnatal visits among mothers attending MCH clinic for routine 6 weeks' immunization in Kisumu County.
2. What are the barriers /provider challenges in implementing guidelines on repeat HIV testing in pregnancy and postnatal period?

2.9 Study Objectives

2.9.1 Primary Objective

To determine the uptake of repeat HIV testing during pregnancy, labor and the postnatal period after an initial negative test in three facilities in Kisumu-Kisumu County Hospital, Ahero Sub-County Hospital and Chulaimbo Sub-County Hospital.

2.9.2 Secondary Objective

To describe barriers to implementing guidelines on repeat HIV testing during pregnancy, labor and the postnatal period including the health system, health care personnel and patient level barriers.

CHAPTER THREE: METHODOLOGY

3.1 Study Design

A cross sectional survey in which mothers taking their children for routine 6 weeks' vaccinations were interviewed using a questionnaire and a qualitative design in which focus group discussions were conducted with the healthcare providers and key informants were interviewed.

3.2 Study setting

The research was conducted in three facilities in Kisumu County (annex 5). Kisumu County has a total of 138 health facilities ranging from one tertiary referral hospital, the Jaramogi Oginga Odinga teaching and referral hospital to level three health facilities. Some are government owned, while others are privately owned by Non - Governmental Organizations either independently or in partnership with the government, playing a critical role in health service provision and research.

Chulaimbo Sub-County Hospital, established in 1976, on the outskirts of Kisumu along the Kisumu Busia highway, has been offering ART services since 2004. The Primary focus of this facility is the HIV/AIDS services with a mission to ensure that there is creation of awareness about HIV/AIDS, reduction in new infection rate and provision of support for those infected with the virus. The facility has an average of 80 deliveries per month.

Ahero Sub-County Hospital which has an average of 120 deliveries per month is a government Sub-county hospital located in Kakolla, Ahero South Sub-location along Kisumu-Nairobi highway that also offers HIV/AIDS related services.

Kisumu County Hospital is located in the middle of Kisumu City and serves a greater number of patients compared to Ahero and Chulaimbo Sub-County Hospitals. Ante-natal care is provided at the facility with various outreach programs coordinated by the hospital. All these facilities have integrated HIV services in the MCHs

These three facilities were chosen to include the various socio-demographic differences among the different sub-counties in the County. KCH is a county referral Hospital and is located in

Kisumu Central. the population around the City is cosmopolitan and most work within the town while Chulaimbo is on the outskirts of the City in Kisumu West and Ahero in Kisumu East. Both Chulaimbo and Ahero Sub-County Hospitals serve a more rural population. Another difference is because of external support as Chulaimbo and Ahero have support from NGOs for their HIV services thus the need to compare and identify the impact of such partnership in the provision of HIV services.

3.3 Study period

The study was conducted over the three month period between November 2017 to January 2018.

3.4 Case Definition

Repeat testing: HIV testing at least 3months after an initial documented negative test result.

3.5 Study Population

Quantitative study: for the cross-sectional survey an exit interview was administered to consecutive mothers attending clinic for the child's routine 6weeks immunization after obtaining informed consent. The qualitative part of the study was conducted among purposively selected health care workers and key informants at the various MCH clinics. The participants were purposively selected to provide variation in socio-demographics and job characteristics including counsellors, nurses, mentor mothers, community health volunteers, officers and doctors directly linked to the clinic. For key informant interviews we interviewed the in charges and the program directors and the Public Health officer in charge of health at the County offices.

3.6 Inclusion Criteria

The following were included in the study:

a). Quantitative study:

Mothers attending the 6 weeks' routine immunization clinic for their children and had negative HIV result at the initial visit during their last pregnancy.

b). Qualitative study:

Health care workers responsible for the day to day testing and treatment of HIV infected women at the MCH purposively selected to include counsellors, nurses, clinical officers, community health volunteers, doctors and key informants.

3.7 Exclusion Criteria

The following were excluded from the study:

a). Quantitative study.

- i. Lack of informed signed consent
- ii. Pregnant women who are known to be HIV positive before the pregnancy and those diagnosed to be HIV positive during their initial visit.

b). Qualitative study.

- i. Lack of informed signed consent.

3.8 Sample Size calculation

The sample size was calculated using Fishers formula as follows:

$$n = \frac{z^2_{1-\alpha/2} \times p(1-p)}{d^2} \text{ (Fisher's et al., 1998)}$$

$$d^2$$

- **n**=Minimum sample size.
- **α** =Level of significance (0.05)
- **$Z_{1-\alpha/2}$** = Standard normal deviate at 95%, confidence interval (1.96)
- **P**= Proportion in the target population with specific characteristic (55% of mothers get retested at ANC).
- **d**=Absolute precision (Error margin), (0.05).
- Therefore $n = 1.96^2 \times (0.55)(0.45)/0.05^2$
- **n**=380

Based on the number of patients attending ANC at the various facilities, study participants were selected from each using a weighted average ratio as shown in the table below:

Table 1: Facilities in Kisumu County

Facility	No. of deliveries per month (proportion)	N
Kisumu County Hospital	200 (50%)	190
Ahero County Hospital	120 (30%)	144
Chulaimbo County Hospital	80 (20%)	76
	100%	380

SAMPLING FRAME;

Screening:

Exclude:

Documented positive
result

Included:

1. Documented HIV
negative result.
2. Mother and child pair
3. 6 weeks' immunization
visit.

Sampling: this was consecutive sampling that was done daily until the desired sample size in each facility was attained.

3.9: Study procedures

3.9.1 Cross sectional Survey

a) Research assistant Training:

The Primary Investigator (PI) trained 2 research assistants on the outline of HIV testing guidelines in pregnancy and immediate postpartum period as delineated in the Kenya 2016 HIV

Treatment Guidelines by National Aids STI Program (NASCO) and on the use of the research questionnaire.

A preliminary visit to the study location was conducted to introduce the research assistants to the clinical staff prior to commencement of the study.

b) Recruitment Process:

The research team identified mothers accessing service at the MCH clinics in the various institutions; these were mothers who were attending clinic for the 6weeks' routine immunization clinics of their children.

The investigator and/ or research assistants approached the mothers and explained the purpose and methods of the study and allowed them to give voluntary consent. At the clinic, all mothers were approached and only those known to be HIV positive either before they were pregnant or during their initial visit were exempted.

c) Ascertainment of HIV infection status:

Women known to have HIV infection previously or those who had tested positive during their initial HIV teste were exempted. The HIV status was ascertained by looking at the documented records that the mother had. This had to be from any hospital document like outpatient cards or books or the mother and child booklet. Only those with documented reports proceeded.

d) Consent signing:

Written informed consent was given on a predesigned consent form. The consent form was written in both English and Kiswahili and provided information describing the study, study procedures to be followed and the benefits and risks of the study. (Appendix 2)The investigator and/or research assistant ensured that the mother understood the information provided on the consent form. At this juncture, any questions pertinent to the study was answered prior to signing of the consent form by the care giver. Consent obtained was voluntary and free from coercion. Mothers who gave consent to take part in the study then signed the consent form which was counter signed by the investigator or research assistant. A copy of the consent form was given to the mothers who consented to the study.

e) Interview process.

A structured questionnaire was then administered. After administration of the questionnaire, those identified to have had a missed opportunity for HIV testing were given the opportunity to have counseling and testing done.

The questionnaire was collecting data as in (Appendix 1).

The data included:

- Sociodemographic details of the mother.
- ANC, Labor and delivery.
- Previous HIV testing and experiences during the testing.
- Awareness on repeat HIV testing recommendation and the actual retesting.
- HIV transmission risks and behavior patterns.

3.9. 2 Focused group discussion:

The principle investigator requested the front-line health care workers including nurses, counselors and clinical officers involved in the service delivery point of interest to participate in a focused group discussion. The participants were purposively selected to provide variations in the job characteristics as above. Written consent was first obtained, and then health care workers were divided into groups of 6-8. A focused group discussion consisting of 8 health care workers was held in the hospital in any of the available rooms. For Kisumu County Hospital there were two sessions as they had bigger numbers. This was moderated by the principle investigator who was recording the discussion while the research assistants were taking notes of emergent themes. The study tool that guided the focused Group Discussion is on (Appendix 3)

3.9. 3 Key informant interviews

This was done after the questionnaires had been filled up and after the focused group discussions with the healthcare workers had been done. It included the managers that were involved in the general management of the PMTCT program as program directors or the medical superintendent that oversee the day-to-day running of the various facilities.

Quality assurance

This was done by carrying out preliminary visit to the various institutions, training of the Research assistants on the guidelines and the study tools that were to be used during the study and carrying out a pre-testing tool before the actual data collection.

3.10: Data management and security

Data collected using the questionnaire tool was keyed in into Microsoft Access database specifically designed for this study, encrypted and secured by a password. To reduce the chances of errors, the data was entered in duplicate by two different data entry persons, and was cross compared for errors.

3.10.1 Data analysis

A) Quantitative data:

Quantitative data:

Quantitative data from questionnaires was checked daily for completeness and coded for appropriate computer entry. The data was analyzed with appropriate parametric and nonparametric tests using IBM Statistics (formerly SPSS for Windows) version 21. Data points were first tabulated. Descriptive statistics was used to analyze variables such as age, sex and socio economic status of the mothers.

Comparison was drawn among the mothers who had repeat tests done and those who did not have repeat tests done using univariate analysis and the factors with multiple logistic regression and analysis using SPSS was used to determine the association of repeat testing and the maternal biodata and antenatal profile and to adjust for cofounders

The dependent variable was repeat HIV test with the independent variables being the Biodata and the ANC profile of the mother. A student's T test was used to establish the association for the numerical data. Bivariate and multivariate analysis was done to establish the association between the different variables such as level of education, distance from the facility, parity and social economic status and how this impacts the utilization of retesting services.

In situations where there was missing data we used SPSS for appropriate missing data imputation and analysis. The results are expected to be disseminated through the university repository and it will be sent to regional and international pediatric journal publishers.

B) Qualitative data:

A code book of themes and subthemes was developed in excel prior to the study with addition of memo and comment function in word was added so as to analyze the qualitative data. The audio recording of the focused group discussions was transcribed. The emergent themes were identified, noted down coded using the excel and presented in tabular form and using thematic analysis approach.

The key informant interviews were also coded according to emerging themes and subthemes using thematic analysis approach.

QDA software was used to code and summarize the data which was then presented as frequency tables of codes and direct quotes from the participants

3.11 Ethical considerations

Before administration of the questionnaire, ethical approval from the Kenyatta National Hospital /University of Nairobi Ethics and Review Committee was obtained. Further clearance to collect data was obtained from the medical superintendent in charge of the hospitals after ethical approval of this proposal. All study participants were provided with information about the study and allowed to voluntarily make an informed choice about their participation after signing the consent form as attached in annex 2.

Study participants who were identified as having missed opportunities for HIV testing and diagnosis were referred to a counselor to facilitate testing. Those diagnosed with HIV received adherence counseling for possible enrolment into the comprehensive care clinic. The findings will inform policy and health systems at the facilities where data will be collected, the County and the health care workers working in the HIV field.

Confidentiality of the study participants was maintained; names and any other identifying information was not shared with persons not directly involved in this study, nor revealed in reports. All questionnaires were assigned unique codes in place of participants' names. The electronic transcripts of the questionnaires were securely stored in a password-protected database that will only be accessible to the investigator. Any hard copy materials that contain information from interviews e.g. field notebooks, audio recordings and questionnaires was stored in locked cabinets that was only be accessed by the investigator and copies given to the supervisors.

STUDY VARIABLES:

Proportion of mothers not tested, or tested but no documentation to support the same, mothers who seroconvert during the pregnancy and those who are newly diagnosed in the post-natal period.

Emerging themes for strengthening repeat testing

- Maternal factors: early visit for the ANC, educating the mothers on the value of repeat tests, involvement of partners in the process.
- Healthcare workers: adequate integration of PMTCT services, more health workers, training and empowering of the health workers.
- Facility factors: provision of adequate space, more workers and continuous education on PMTCT, training and training opportunities, provision of more support beyond HIV diagnosis.

These were based on the data from previous studies that had been on the same topic by Rogen et al (17).

OUTCOMES:

Preliminary data on the success of implementation of policy on repeat testing and an indication of the challenges and opportunities for PMTCT.

CHAPTER FOUR: RESULTS:

4.1: Study population

We interviewed 380 mothers attending MCH clinic for routine child immunization at 3 health facilities in Kisumu County: Kisumu County Referral Hospital (172), Ahero Sub-County Referral Hospital (133) and Chulaimbo Sub-County Referral Hospital (75).



 Chulaimbo County Hospital

 Kisumu County Hospital

 Ahero County Hospital

PART ONE: QUANTITATIVE DATA

Table 1: Socio-demographic characteristics

Characteristic		n	%
Site	Kisumu	172	45.3
	Ahero	133	35.0
	Chulaimbo	75	19.7
Age: Median [IQR]		25 [21 – 31]	
Level of education	No formal education	24	6.3
	Primary	102	26.9
	Secondary	148	39.1
	Tertiary	105	27.7
Marital status	Married	243	64.3
	Single	104	27.5
	Separated/divorced	20	5.3
	Widowed	11	2.9
If married, do you stay with your husband or he works away in another town?	Stay in the same town and house	188	77.7
	Works away in a far off town	54	22.3
Knows the HIV status of your sexual partner/husband	Yes	168	47.3
	No	187	52.7
Employment	Salaried	88	23.7
	Businesswoman	165	44.4
	Housewife	119	32.0
Experience during the testing	Extremely comfortable	46	12.6
	Very comfortable	85	23.3
	Comfortable	141	38.6
	Uncomfortable	52	14.2
	Very uncomfortable	41	11.2
If the results were positive, comfortable sharing the results with husband/sexual partner	Yes	240	71.4
	No	96	28.6
	Not sure	0	.0
Considers to be at risk of contracting HIV		137	43.6
Reasons for feeling at risk of infection	Polygamous relationship	64	47.1
	Multiple sexual partners	65	47.8
	Sex worker	5	3.7
	Injection drug user	1	.7
	Recurrent STIs	15	11.0
	Other reason	18	13.2
Aware that needed a repeat test in the 3rd trimester or immediately after delivery		218	58.1
If yes was the testing done?		196	89.9
Approached for HIV testing on current visit		256	68.4
Consented to having a HIV test		213	84.2
If no, reasons for declining a HIV test	Stigma	4	19.0
	Already know my status	10	47.6
	Afraid of test results	2	9.5
	Lack of spouse permission	4	19.0
	Other	2	9.5

The median age was 25 [IQR 21-31]. Majority of the women had at least some form of education: Primary 102 (26.9%), Secondary 148 (39.1%) and Tertiary 105 (27.7%). Almost two thirds of the women 243 (64.3%) were married, 104 (27.5%) were single, 20 (5.3%) were separated and 11 (2.9%) were widowed.

Of those who were married, most were staying with their husbands 188(77.7%), however 54 (22.3%) had their husbands staying away from home. Less than half of the women 168 (47.3%) were aware of the HIV status of their partners. Most of the women were involved in business 165 (44.4%), with 119 (32%) being housewives and 88 (23.7%) on a salaried job.

Sexual and reproductive history

The mean age of the children was 3.7 [standard deviation 3.6] months. These women had an average of 3 children, attended ANC for the first time at 7 months on average and made an average of 4 visits during the pregnancy. Most of the deliveries 355 (94.9%) were conducted by skilled personnel and were delivered mostly by SVD 286 (76.9%).

HIV Testing information

Most of the women 372 (97.9%) had a HIV test done during their first visit at the ANC and happened on average at 7 months of pregnancy. This was comparable across the 3 sites: Kisumu (97.1%), Ahero (98.5%) and Chulaimbo (98.7%). A third of the women 272 (74.5%) of the women found the test comfortable with only 33 (28.2%) feeling uncomfortable. Almost three quarters 240 (71.4%) of the mothers were willing to disclose their HIV status to their partners if results turned positive. Almost half of the women felt at risk of HIV infection 137 (43.6%).

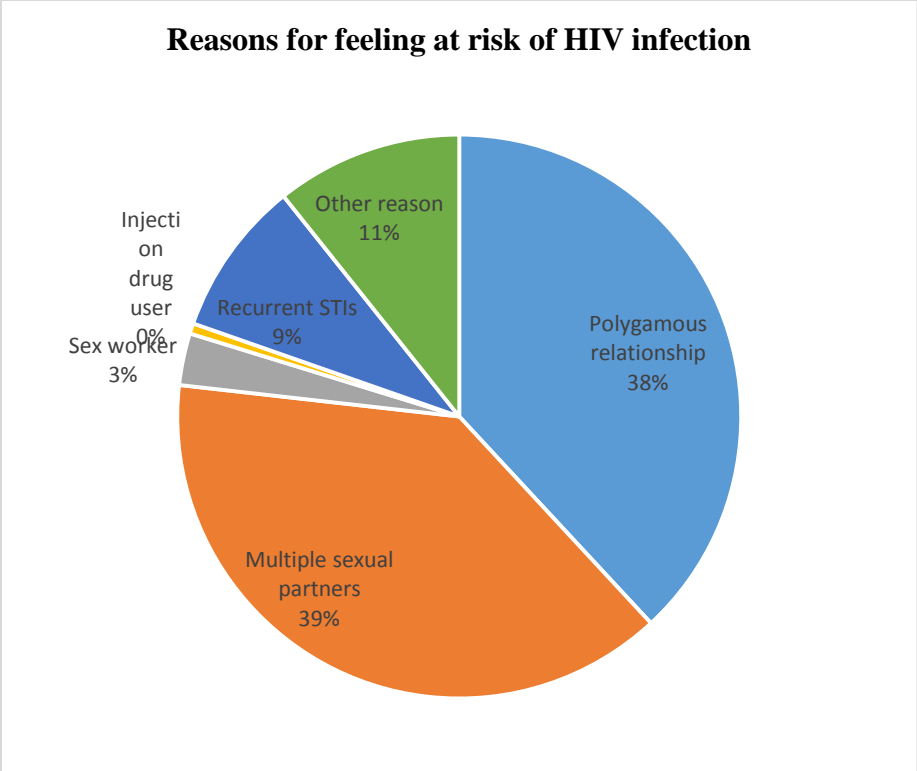


Figure 2: Reasons for feeling at risk of HIV infection

The most common reasons given by the women for feeling at risk of HIV infection were multiple sexual partners 39% and Polygamous relationships 38%. Over half 218 (58.1%) of the women were aware that they needed a repeat test in the 3rd trimester or immediately after delivery and of these, 196 (89.9%) reported having gone through this test. During the current visit, 256 (68.4%) reported having been approached for a HIV test with 213 (84.2%) consenting to the test. Most of those who declined to have a HIV test reported that they already knew their results 10 (47.6%), lack of spouse’s permission 4 (19%), stigma 4 (19%) and only 2 (9.5%) saying they were afraid of the test results.

PART B: BIVARIATE ANALYSIS

Comparison between sites

	Site								p-value
	Kisumu		Ahero		Chulaimbo		Total		
	N	%	N	%	n	%	n	%	
HIV test done during your first visit to the clinic	167	97.1	131	98.5	74	98.7	372	97.9	0.6
Aware that needed a repeat test in the 3rd trimester	127	74.7	69	53.1	22	29.3	218	58.1	<0.0001
If yes was the testing done?	109	85.8	65	94.2	22	100.0	196	89.9	0.045
Approached concerning HIV testing during today's visit	98	58.0	111	85.4	47	62.7	256	68.4	<0.0001

The three study sites were found to be similar with respect to offering HIV test during the first ANC visit (Kisumu 97.1% vs Ahero 98.5% vs Chulaimbo 98.7%, $p=0.6$). However, the sites differed with respect to: 1) Awareness of need for repeat testing (Kisumu 74.7% vs Ahero 53.1% vs Chulaimbo 29.3%, $p<0.0001$), 2) Offering repeat testing (Kisumu 85.8% vs Ahero 94.2% vs Chulaimbo 100%, $p=0.045$) and 3) approaching women on the current visit (Kisumu 58.0% vs Ahero 85.4% vs Chulaimbo 62.7%, $p<0.0001$).

Table 2: Factors associated with initial HIV testing.

		Tested at first visit		Not tested at first visit		p-value
		n	%	n	%	
Level of education	No formal education	23	95.8	1	4.2	0.336
	Primary	99	97.1	3	2.9	
	Secondary	145	98.0	3	2.0	
	Tertiary	105	100.0	0	.0	
Marital status	Married	240	98.8	3	1.2	0.207
	Single	102	98.1	2	1.9	
	Separated/divorced	20	100.0	0	.0	
	Widowed	10	90.9	1	9.1	
Employment	Salaried	88	100.0	0	.0	0.023
	Businesswoman	164	99.4	1	.6	
	Housewife	114	95.8	5	4.2	
Do you know the HIV status of your sexual partner/husband	Yes	167	99.4	1	.6	0.218
	No	183	97.9	4	2.1	
Type of delivery (the last delivery)	Skilled	352	99.2	3	.8	0.687
	Non-skilled	19	100.0	0	.0	
Mode of delivery	SVD	283	99.0	3	1.0	0.340
	CS	86	100.0	0	.0	
Did you attend all the ANC visits as suggested by the midwife/doctor?	Yes	190	99.5	1	.5	0.917
	No	164	99.4	1	.6	
Age	Mean	26.3		21.3		0.045
Parity	Mean	2.6		2.2		0.649
No. of ANC Visits	Mean	3.7		4.0		0.753

Except for employment and age, no other socio-demographic characteristics were found to be associated with testing at the initial ANC visit. All women on salaried employment were tested on their first visit compared to 99.4% of those doing business and 95.8% of housewives (p=0.023) On average, women tested on the first visit were older than those not tested (26.3years vs 21.3 years, p=0.045)

Table 3: Factors associated with repeat testing

		Repeat testing done?				p-value
		Yes		No		
		N	%	n	%	
Site	Kisumu	109	85.8	18	14.2	0.045
	Ahero	65	94.2	4	5.8	
	Chulaimbo	22	100.0	0	0	
Level of education	No formal education	14	100.0	0	.0	0.225
	Primary	49	84.5	9	15.5	
	Secondary	78	92.9	6	7.1	
	Tertiary	55	88.7	7	11.3	
Marital status	Married	151	93.2	11	6.8	0.006
	Single/ Separated/divorced/widowed	45	80.4	11	19.6	
If married, stays with your husband	Stay together	120	91.6	11	8.4	0.100
	Works away	30	100.0	0	.0	
Knows the HIV status of your sexual partner/husband	Yes	108	93.1	8	6.9	0.109
	No	76	86.4	12	13.6	
Type of delivery (the last delivery)	Skilled	183	89.3	22	10.7	0.231
	Non-skilled	12	100.0	0	.0	
Mode of delivery	SVD	157	89.7	18	10.3	0.920
	CS	37	90.2	4	9.8	
		N	Mean	Std. Deviation	p-value	
Age	Tested	196	26.832	6.3559	0.027	
	Not tested	22	23.727	4.2447		
Time when attended the 1st ANC (trimester)/weeks	Tested	190	6.29	5.310	<0.0001	
	Not tested	21	11.71	8.480		
No. of ANC visits attended	Tested	168	3.95	1.467	0.786	
	Not tested	22	3.86	1.207		

After assessing factors associated with accepting a repeat test we found that there were differences in the acceptance rates across the 3 sites (Kisumu 85.8%, Ahero 94.2 and Chulaimbo 100%, $p=0.045$). Marital status influenced the decision to undertake a repeat HIV test where married women were more likely to accept a repeat test than unmarried (93.2% vs 80.4%, $p=0.006$). Older women were more likely to accept repeat testing than younger women (26.8

years vs 23.7 years, $p=0.027$). Women who attended ANC earlier were more likely to accept repeat HIV testing than those who came later (6.3 weeks vs 11.7 weeks, $p<0.0001$).

The following factors did not appear to influence the decision to have a repeat testing: level of education, ($p=0.225$); staying with partner ($p=0.100$); awareness of HIV status of the spouse ($p=0.109$); receiving skilled delivery during last pregnancy ($p=0.231$) and mode of delivery ($p=0.920$).The number of ANC visits did not influence the decision to undertake a repeat HIV test $p=0.786$ respectively.

PART C: MULTIVARIATE ANALYSIS

	Coefficient	S.E.	p-value	OR	95% C.I. for OR	
					Lower	Upper
Age	-.090	.045	.046	.914	.836	0.999
Time attended the 1 st ANC	.105	.030	.001	1.110	1.046	1.179

On multivariate analysis, it was found that older women were likely to take up repeat testing (OR 0.9 [95% CI of OR 0.8 - 0.9], $p=0.046$) and women initiating their ANC visits earlier were more likely to accept a repeat HIV test (OR 1.1 [95% CI of OR 1.1 – 1.2], $p=0.001$).

PART TWO: QUALITATIVE ANALYSIS:

Focused Group Discussions

FGD of the caregivers were carried out. The FGD was conducted in each facility however Kisumu County Hospital had two sessions due to the bigger number of service providers. Each session had 8 participants and conducted over a duration of 60 to 90 minutes. The sessions were conducted on 6th and 7th of January 2018. After transcribing and summarizing the data, the following were the main results.

Table 4: Factors affecting repeat testing at the various study sites

Site Theme	Code	Ahero		Chulaimbo		Kisumu		Total	
		N	%	N	%	n	%	N	%
Distance	Far	5	7.2%	2	3.5%	0	0.0%	7	3.6%
	Close	4	5.8%	1	1.8%	2	2.8%	7	3.6%
Quality of Care	Comprehensive	5	7.2%	3	5.3%	8	11.3%	16	8.1%
	Friendly staff	3	4.3%	4	7.0%	2	2.8%	9	4.6%
	Trained staff	1	1.4%	3	5.3%	2	2.8%	6	3.0%
	Inadequate staff	6	8.7%	2	3.5%	4	5.6%	12	6.1%
Institutional factors	Staffing issues	2	2.9%	4	7.0%	5	7.0%	11	5.6%
	Rooms and space	4	5.8%	2	3.5%	5	7.0%	11	5.6%
	Long queues and turnaround time	5	7.2%	4	7.0%	6	8.5%	15	7.6%
	Documentation	11	15.9%	14	24.6%	11	15.5%	36	18.3%
	Poor community support	4	5.8%	4	7.0%	6	8.5%	14	7.1%
Patient Factors	Stigma	3	4.3%	2	3.5%	3	4.2%	8	4.1%
	Intimate partners	6	8.7%	4	7.0%	8	11.3%	18	9.1%
	ANC non-attendance	7	10.1%	5	8.8%	6	8.5%	18	9.1%
	Home delivery	3	4.3%	3	5.3%	3	4.2%	9	4.6%

Figure 3: Factors affecting repeat testing in Ahero Sub-County Hospital

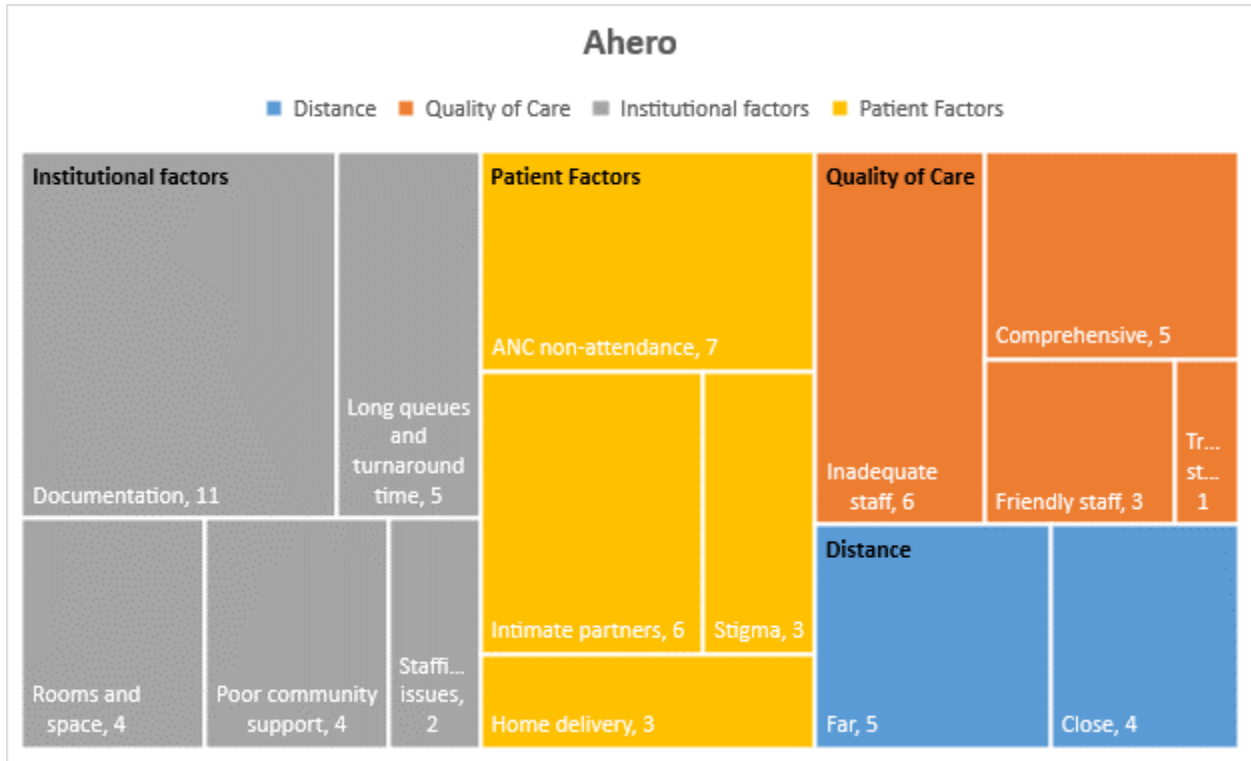


Figure 4: Factors affecting repeat testing in Chulaimbo Sub-County Hospital.

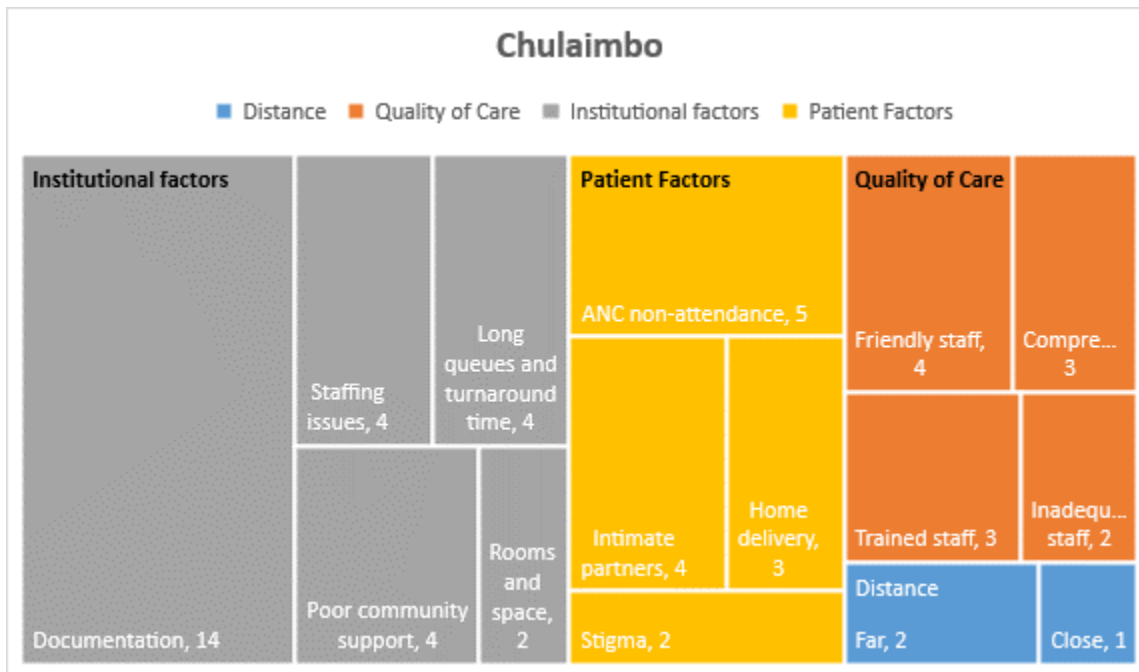


Figure 5: Factors affecting repeat testing in Kisumu County Hospital.

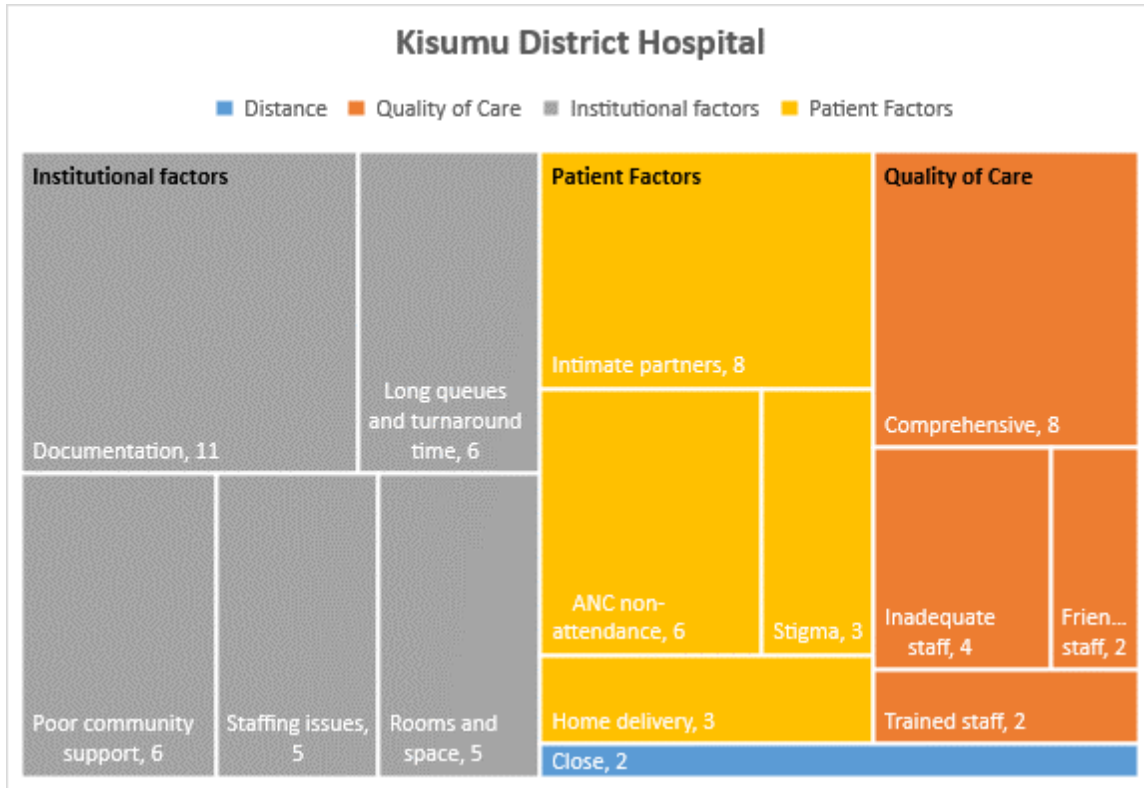
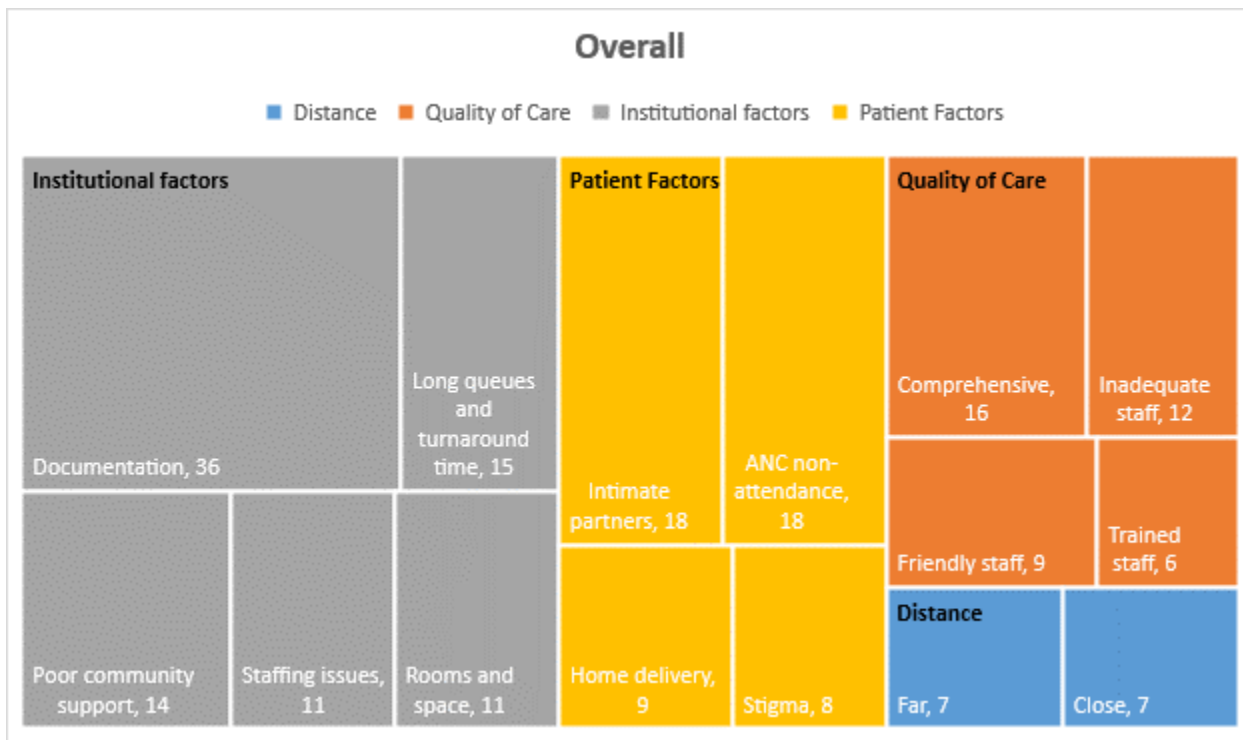


Figure 6: Over all summary of the factors affecting repeat testing in the three facilities.



Distance:

While most of the respondents viewed the three facilities as preferable to them because of their proximity to their homes and the transport network, those who came from far flung areas found it difficult to access them because of impassable roads and high transport costs. Distance did not seem to have an impact in Kisumu district hospital.

“most patients come here because it is in town and they don’t have to struggle with transport”

“when it rains and this place gets flooded the patients cannot come to the hospital because even the bodaboda people refuse to carry them”

“it is only accessible for those staying along the highway, but those of from the rural have to walk over 5kilometers”

Quality of Care

Respondents felt that they were mostly offered great services because the staff were local and well trained

“most of us are from the local area and even those posted from other places end up staying longer and relating well with the community”

“when you are from the community, it is easier for the patients to interact with you “

However, there was heavy dependence on partner staff and this affected the quality of service when the partners pulled out.

“we have partnered with many organizations who have seconded their staff to the facility, we have to rely on their schedule if a worker goes on leave or training then we struggle”

“the County government did not honor their agreement to put some of the workers on permanent employment and so the sponsors withdrew them from the facility”

“several partners have come to help us , however we have been unable to absorb their workers as these need to be approved by the County Service Board. The question of personnel is one that will take a while to solve due to funding”

Key informant

Institutional factors

Although there was evidence of deliberate efforts to improve the services at these facilities, it was evident that industrial actions affected the services.

“the last couple of months we have been having strike after strike and this affected the stability and service provision across the county”

“most mothers were not able to afford services in other private facilities and therefore opted out of seeking ANC services”

Availability of an appropriate testing area was a big influence on testing uptake. Data collection was also weak and training on new guidelines was on very few people and was not updated regularly and in a timely manner. These factors were similar across the three sites.

Patient Factors

Many women especially the multi paras did not see the need to come to the facility early. The very young women also had challenges since they were still in disbelief that they were pregnant. Stigma was still a major problem and HIV/AIDS is still being viewed as the “big disease” by many. The feeling of the need to have intimate partners tested also delayed the testing process. These factors did not differ across the three sites.

CHAPTER FIVE: DISCUSSION

A total of 380 mothers attending MCH clinic for their children's routine childhood immunization clinics were interviewed, these were women whose average age was 25 years and this was similar to the study done by Kinuthia et al whose mean age was 23.7 years (SD 4.9)(19). Overall most of the women were educated with two thirds of the women 243 (64.3%) being married, 104 (27.5%) were single, 20 (5.3%) were separated and 11 (2.9%) were widowed and this was a slight variation from what Ambuchi(18) found at KNH where the married women were at 85.3% and the widowed and divorced women contributing 1.0% and 0.2% respectively and also slightly lower than the study done by Kinuthia et al where 86.8% were married women(19) . Of those who were married, most were staying with their husbands 188(77.7%), however 54 (22.3%) had their husbands staying away from home.

According data from the National AIDS control Council, the initial testing rates have been good at 96% (6), (8), and this has been attributed to inclusion of the initial testing in the Mother and Child booklet and increased awareness both of the health workers and the mothers (6)(8).Our initial HIV testing rates was higher at 97.9 %. The three study sites were found to be similar with respect to offering HIV test during the first ANC visit (Kisumu 97.1% vs Ahero 98.5% vs Chulaimbo 98.7%, $p=0.611$).

The overall retesting rate was found to be 68.4% and this was higher than the national retesting rates of 55%. Kinuthia et al looking at the gaps in HIV diagnosis and care had also found that of the children who had HIV disease 45.7% of the mothers had had the initial HIV test done but had not been retested (11) thus missing the chance for early initiation of ART. An overall retesting rate of 68.4 is high compared to National retesting rates 55% and Kinuthia et al study.(11), but this however is below the National targets if we are to eliminate paediatric HIV.(6) (8).

We also found a gap in the awareness for repeat testing and provision of the same. Over half 218 (58.1%) of the women were aware that they needed a repeat test in the 3rd trimester or immediately after delivery and of these, 196 (89.9%) reported having gone through this test. Lowest level of awareness were at Chulaimbo Sub County hospital. Rogen et al (17) cited lack of awareness as one of the factors that hindered the uptake of repeat testing and this was consistent with what we found in our study. Thus improving awareness among the mothers and

more importantly among the health workers and health care providers can help improve retesting rates. During the current visit, 256 (68.4%) reported having been approached for a HIV test with 213 (84.2%) consenting to the test. Mothers are willing to have the test when offered, of the 380 approached for retesting, only 10 had not received the test and among them 8 did not qualify to have retesting done as they had seroconverted and had been initiated on ART, this therefore implies that the biggest gap in the provision of the retesting is because of lack of awareness among the mothers but more importantly among the healthcare workers and failure to offer the same.

Overall 8 women were found to have seroconverted since the last negative test in pregnancy . The seroconversion rate for these three facilities for the three months of the study was at 2.1 % a rate lower than the 6.8% found in a similar earlier study in the same region and higher than the 0.8% in KNH.(11) (18) .

Awareness of the partner's HIV status has been known to reduce risk of transmission however in our study less than half of the women 168 (47.3%) were aware of the HIV status of their partners. Women who attended ANC earlier were more likely to accept repeat HIV testing than those who came later (6.3 weeks vs 11.7 weeks, $p < 0.0001$). a study by Anna Joy et al had demonstrated that late presentation in the clinic was one of the key determinant of reduced uptake of repeat HIV testing services(11). Thus after our analysis which was similar to the other studies (17), and (11) and this was the observation that collaborated by the qualitative data. Mothers should thus be encouraged to initiate ANC visits as soon as they know they are pregnant.

The age of the mother on multivariate analysis was also found to be significant, it was found that older women were unlikely to take up repeat testing (OR 0.9 [95% CI of OR 0.8 - 0.9], $p = 0.046$) this was contrary to the result found by Rogan et al in their qualitative analysis (17) as they had stated that older women had a better chance of getting retested than younger women. From qualitative analysis the observation that collaborated by the quantitative study findings was only the late start of attending ANC clinic.

5.1 Study strengths

- 1) Methodology: The use of both qualitative and quantitative methods including use of questionnaires, Focus Group Discussion and Key informant interviews enabled us to have varied forms of data.
- 2) Having a decent sample size of 380 with consecutive sampling ensured a higher degree of representativeness as all available subjects were included.
- 3) The inclusion of three facilities that are varied in terms of location and size with different external influences, one County Hospital and two Sub County Hospitals.

5.2 Study limitations

- 1) The study was carried out in facilities that are in the environs of one region of the country thus limiting the ability to generalize the results. All the three facilities were from Kisumu County.
- 2) The study was carried out at a certain point in time and thus will only give information about period prevalence.
- 3) The study was carried out over three months and this might not factor in the seasonal variability. Selection bias.
- 4) Selection bias: The participants selected from the hospital were likely to be utilizing the services.

CONCLUSION:

According to our study Initial HIV testing rates were high at 97.4% compared to National rates of 96%, mothers were willing to have repeat tests done. Awareness of the need to have repeat HIV testing translated to increased retesting rates and thus the need to strengthen awareness strategies. The average retesting rate was higher than the National rates at 68% compared to 55%. Factors that were significantly associated with increased retesting rates on multivariate analysis were the age of the mother as older women were unlikely to take up repeat and women initiating their ANC visits earlier.

5.3 Recommendations

- I. Government involvement of Counties and Sub Counties in the implementation of National guidelines.
- II. Trainings and continuous Education on key areas like PMTCT.
- III. Improvement on hospital based provision of services for mothers especially for sensitive areas like HIV testing and counselling.
- IV. Improved awareness and enhancing awareness strategies to ensure that both the mothers seeking the services and the workers providing the services know about the guidelines.

5.4 Persisting Questions:

The persisting questions are whether the rate of sero conversion increasing or decreasing in the country? Also what is the best way of ensuring that policies are rolled out with inclusion of all health facilities especially the lower cadre hospitals and private facilities?

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APPENDICES

Appendix 1: Study Questionnaire

HIV testing practices in pregnancy and post-natal period in Kisumu County

To be filled by the investigator

1. Study identification number.....

2. Age.....

3. Level of education (*mark x where appropriate*)

No formal education

Primary

Secondary

Tertiary

4. Marital status

(a) Married

(b) Single

(c) Separated/divorced

(d) Widowed

If married, do you stay with your husband or he works away in another town?

Stay in the same town and house

Works away in a far off town

Do you know the HIV status of your sexual partner/husband

(a) Yes

(b) No

5. Employment

Salaried

Businesswoman

Housewife

6. Parity

7. Age of last born child

8. Type of delivery (the last delivery)

Skilled

Non skilled

9. Mode of delivery

SVD

CS

10. During the last pregnancy:

Time when attended the 1st ANC (trimester)/weeks

No. of ANC visits attended

Did you attend all the ANC visits as suggested by the midwife/doctor?

If no, are there any reasons why you missed an appointment (*tick as appropriate*)

Not informed on need for return visit

Lack of money

Attending other functions e.g. funeral

Long distance to the clinic

Poor attitude from the health care workers

Other reason, kindly indicate.....

Did you have any HIV test done during your first visit to the clinic?

If yes, how many weeks of gestation were you?

.....

How was your experience during the testing (*mark where applicable*)?

- 1. Extremely comfortable
- 2. Very comfortable
- 3. Comfortable
- 4. Uncomfortable
- 5. Very uncomfortable

If the results were positive, would you have been comfortable sharing the results with your husband/sexual partner

Do you consider yourself at risk of contracting HIV?

If yes, what makes you think so? (*mark as appropriate*)

Polygamous relationship

Multiple sexual partners

Sex worker

Injection drug user

Recurrent STIs

Other reason.....

Were you aware that you needed a repeat test in the 3rd trimester or immediately after delivery

(a) Yes (b) No

If yes was the testing done?

Yes No

13. Have you been approached concerning HIV testing during today's visit?

a) Yes b) No

ii) If yes, have you consented to having a HIV test?

a) Yes b) No

If no what are your reasons for declining a HIV test.

a) Stigma

b) Already know my status

c) Afraid of test results

d) Lack of spouse permission

e) Other.....

Appendix 2: Consent form

STUDY TITLE: HIV testing practices in pregnancy and post-natal period in Kisumu

Study identification number:.....

Date:

Investigator: Dr. Molla Adelene Apondi Lollah (MB ChB)

Paediatric Resident, University of Nairobi

Telephone number: 0720831926

Prof. Nduati Ruth W.

MbChB, Mmed (Paediatrics), MPH, Fellow of Primary Health care,

Professor Department of Paediatrics and Child Health

University of Nairobi

Tel no: 0722235323

Email:ruth-nduati2000@yahoo.com.

Investigators Statement

This is a kind request to you to participate in this research study. This form will provide information you need to know so as to decide whether to participate in this study or not.

Introduction

AIDS is a disease caused by the HIV virus which is spread via sexual contact, blood and blood products and from mother to child during pregnancy, labour and breast feeding. Mothers can acquire the virus during their pregnancy and this increases the chances of transmission to the child. A repeat test is thus required to ensure that we eliminate mother to child transmission. It is important to detect the virus early so as to begin antiretroviral therapy early therefore reduce the rate of transmission.

Benefits

Those who have not been tested before will be offered counselling services and HIV tests done.

Those who were initially not offered a repeat test and are willing to know their status will be given the opportunity to undergo testing.

The results of this study will be shared with you and your caregiver. The results will also be used by your care givers in this clinic to improve care of other pregnant women during their pregnancy and after delivery.

Risks

There will be no risks to you during this study. No invasive procedures will be carried out in this study and refusal to participate will not influence the quality of care we given to you during this visit and in subsequent visits in the facilities.

Voluntariness

This study is on a voluntary basis. No financial rewards will be accorded to those who participate in this study. Refusal to participate will not compromise the care given to you.

Confidentiality

The information obtained about you will be kept in strict confidence. No information will be released to any individual without your permission. Overall findings regarding all the mothers will be discussed. Your identity will not be revealed during these discussions.

Problems or questions

If you have any about the study or the use of results you can contact the principal investigator Dr. Molla Lolla by calling 0720831926.

If you have any questions about your rights as a research participant you can contact the Kenyatta National Hospital Ethics and Research Committee (KNH-ESRC) by calling 2726300Ext 44355.

CONSENT

The research study, risks and benefits has been explained to me. No experimental or invasive procedures have been identified. By signing this form, I agree to participate in this study. I understand that my participation is voluntary and I do not have to sign this form if I do not want my data included in this study. I declare that no coercion has taken place and I have been accorded the opportunity to ask questions and seek clarification regarding this study.

Signature of Subject:.....

Date: Time: A.M/P.M (Circle the appropriate time)

PERSON OBTAINING CONSENT

I have explained the nature and purpose of this study and have answered all the questions to the best of my ability. I will provide a signed copy of this form.

Name of person obtaining consent:.....

Signature of person obtaining consent:.....

Date: Time: A.M/P.M (Circle appropriate time)

INVESTIGATOR

Signature of investigator:

Date: Time: A.M/P.M (Circle appropriate time)

Swahili version of the consent form

FOMU YA IDHINI KUHUSU UPIMAJI WA VIRUSI YA UKIMWI KIPINDI CHA UJAUZITO NA BAADA YA KUJIFUNGUA MJINI KISUMU.

Nambari ya kitambulisho ya utafiti:

Tarehe:

Maudhui ya utafiti:

Upimaji wa virusi vya Ukimwi katika kipindi cha ujauzito na baada ya kujifungua katika wilaya ya Kisumu.

Mpelelezi: Dr. Molla Apondi Lollah (MB CHB)

Watoto mkazi Chuo Kikuu cha Nairobi.

Namba ya simu: 0720831926

Wasimamizi:

Prof. Nduati Ruth W

MbCHB ,MMed (Paed) , MPH,

Profesa Idara ya watoto na Afya ya Mtoto

Chuo Kikuu cha Nairobi

0722235323.

Taarifa ya mtafiti:

Hii ni aina ya ombi kwa kushiriki katika utafiti huu . fomu hii inatoa maelezo Zaidi kuhusu utafiti na itakupa habari unayohitaji kuamua kama utashiriki utafiti huu au la.

Mwanzo

Ukimwi ni ugonjwa unaosababishwa na virusi vya ukimwi ambayo inaenezwa kupitia ngono, damu na damu na bidhaa za kutoka kwa mama kwenda kwa mtoto wakati wa ujauzito, mama anapojifungua ama wakati ule anapo nyonyesha mtoto. Mama anaweza kupata virusi wakati wa ujauzito na hii kuongeza nafasi ya maambukizi kwa mtoto. mtihani Rudia ni shaba inahitajika ili kuhakikisha kuwa mama anajua hali yake ya vizuri ilikupunguza chanzo cha kuambukiza mwanawe.

Ni muhimu kuchunguza virusi mapema ili kuanzisha tiba ya kurefusha maisha mapema kwa hivyo kupunguza kasi ya maambukizi.

Faida.

Wale amabao hawajapimwa ,watapatiwa maelezo kisha wata pimwa ili kujua hali yao ya virusi.

Wale ambao walikuwa wamepiwa awali katika mimba watapewa nafasi ya kupima tena ili kuhakiksha hali yao ya sasa hivi.

Watakao patikana na vizuri watapewa maelekezo na kufuatiliwa ili kuanzisha madawa ya kuzuia kuenezwa kwa virusi hivi.

Matokeo itatumiwa kuhakikisha kuwa huduma inayotolewa kwa akina mama wakati wa ujazito na baada ya kujifungua inaboreshwa.

Hatari

Hakutakuwa na hatari yoyote kwa wale wanao husika katika utafiti huu. Iwapo hautashiriki katita utafiti huu , utaendelea kupokea matibabu bora bila kugandamizwa wakati wowote wa ziara katika hospitali.

Hiari/Kujitolea

Utafiti huu ni kwa hiari,hakuna zawadi yoyote ya kifedha itatunukiwa yeyote atakaye shiriki utafiti huu.Kukataa kushiriki hautadunisha ubora ya huduma utakayo patiwa utakapo zuru hospitali shirika.

Usiri

taarifa zitakazopatikana utawekwa katika imani kali. Hakuna Taarifa itatolewa kwa mtu yeyote bila idhini yako. matokeo ya utafiti wa jumla Kuhusu huduma hizo za akina mama zote zitajadiliwa. Utambulisho wako hautakuwa wazi Wakati wa majadiliano hayo.

Matatizo au maswali

Kama una swali lolote kuhusu utafiti au matumizi ya matokeo unaweza kuwasiliana na anayehusika na uchunguzi Dr.Molla Lolla kwa kupiga 0720831926

Kama una maswali yoyote kuhusu haki zako kama mshiriki wa utafiti unaweza kuwasiliana

Kenyatta National Hospital Maadili na Kamati ya Utafiti (KNH-ESRC) kwa kupiga

2726300Ext 44355

IDHINI

Hii ni kuhakiksha kuwa nimeelezwa kwa upana kuhusu utafiti, hatari na faida ya utafiti huu. No majaribio . Kwa kujaza fomu hii ni hakikisho kuwa nimekubali kushiriki utafiti huu. Naelewa kwamba kushiriki kwangu ni wa hiari na sina kuingia hii

sura kama sitaki data yangu ni pamoja na katika utafiti huu. Ninatangaza kwamba hakuna kutumia nguvu imechukua

kuweka na nimekuwa wanayopewa nafasi ya kuuliza maswali na kutafuta ufafanuzi

Kuhusu utafiti huu.

Sahihi ya mshiriki:

Tarehe: Saa: A.M / p.m (Circle Time Sahihi)

Anayehusika na Idhini:

Hii ni kuhakikisha kuwa nimeeleza mshiriki kuhusiana na lengo la utafiti huu na kuwa nilijubu maswali yote kwa kadri ya uwezo yangu. nitatoa nakala iliyotiwa saina ya fomu hii.

Jina la Mtu Kupata ridhaa:

Sahihi ya Mtu Kupata ridhaa:

Tarehe: Saa: A.M / p.m (Circle Sahihi Time)

mpelelezi

Sahihi ya uchunguzi:

Tarehe: Saa: A.M / p.m (Sahihi: muda)

Appendix 3: Focused group discussion guide

Study title: **HIV testing practices in pregnancy and post-natal period in Kisumu.**

Investigator

This study will be conducted by Dr. Molla Adelene Apondi, postgraduate student studying Paediatrics and Child Health at the University of Nairobi.

Invitation to Participate & Purpose

You are being invited to participate in a discussion concerning HIV testing and diagnosis in pregnant mothers during their pregnancy period, labour and post-natal period. Thank you for taking time out of your busy schedule to consider participation.

Voluntary Participation:

Your participation in this evaluation is completely voluntary and you may withdraw your consent to participate at any time during the process. If you choose to do so, any information derived from your participation will be deleted from the evaluations findings.

Methods/Procedures:

The methods of data collection for this study will be focus groups. The sessions will be audio-taped, and the audio-tapes transcribed, to ensure accurate reporting of the information that you provide. No one's name will be asked or revealed during the focus groups. However, should another participant call you by name, the transcriber will be instructed to remove all names from the transcription. The audio-tapes will be stored in locked files before and after being transcribed. Tapes will be destroyed within 2 weeks of completing transcription and the transcriptions will be destroyed 2 years after completion of the evaluation.

Confidentiality:

If you choose to participate, you will not be asked your name at the focus group. You will not need to use your name in the focus groups. If by chance, you or someone you know addresses you by name in the sessions, the transcriber will be instructed to delete all names from the transcription. There will be no names attached to the tapes or transcriptions, and there will be

no identifying information or names used in any written reports or publications which result from this evaluation project. Your participation in this evaluation will be strictly confidential. All findings used in any written reports or publications which result from this evaluation project will be reported in aggregate form with no identifying information. It is, however useful to use direct quotes to more clearly capture the meanings in reporting the findings from this form of evaluation. You will be asked at the end of the focus group if there is anything you said which you do not want included as a quote, and we will ensure that they are not used.

Risks and Inconveniences:

There are no anticipated physical risks to participants. Focus group members will be asked to keep the information provided in the groups confidential; however, a potential risk that might exist for some would be that information about your workplace might be discussed outside the group by other participants and be traced back to you. If this is a potential issue for you, you are encouraged to ask for an individual interview with one of the researchers who would then be knowledgeable of and bound by confidentiality.

Benefits

A potential benefit of participating in this evaluation for you could be having an opportunity to connect with other allies and share similar and divergent experiences . this may help clarify and validate your experiences within this study. The benefits to society would be based on establishing a clearer understanding of the experiences faced by mothers, health care workers and administrators in ensuring the implementation of the NASCOP guidelines on HIV testing in pregnancy and post natal period.

Questions

If you have any questions about this study at any time, you may contact Dr. Molla Adelene Apondi Lollah on 0720831926 who will be happy to answer any of your questions.

Authorization

You will be given a copy of this consent form to keep for your records. Once again, thank you for taking time out of your busy schedule to participate in this evaluation process.

Printed Name of the Participant _____

Signature of the Participant _____

Date _____

Printed Name of the Investigator _____

Signature of the Investigator _____

Appendix 4: Focused group discussion guide: Health care workers

Consent Process

Consent forms for focus group participants will be completed in advance by all those seeking to participate as below:

Thank you for agreeing to participate. We are very interested to hear your valuable opinion on the factors that influence uptake of HIV retesting services in the ANC and PNC clinics.

- *The purpose of this study is to learn how mothers attending ANC view utilize the retesting services and how the health care workers implement the testing guidelines. We hope to learn things that the Ministry of Health can use to improve working conditions and other factors that would improve HIV retesting uptake services in Kenya.*
- *The information you give us is completely confidential, and we will not associate your name with anything you say in the focus group.*
- *We would like to tape the focus groups so that we can make sure to capture the thoughts, opinions, and ideas we hear from the group. No names will be attached to the focus groups and the tapes will be destroyed as soon as they are transcribed.*
- *You may refuse to answer any question or withdraw from the study at anytime.*
- *We understand how important it is that this information is kept private and confidential. We will ask participants to respect each other's confidentiality.*
- *If you have any questions now or after you have completed the questionnaire, you can always contact a study team member like me, or you can call the Uganda project team leaders whose names and phone numbers are on this form.*
- *Please check the boxes on page 2 and sign to show you agree to participate in this focus group.*

Introduction:

1. Welcome

Introduce yourself and the notetaker, and send the Sign-In Sheet with a few quick demographic questions (age, gender, occupation) around to the group while you are introducing the focus group.

Review the following:

- Who we are and what we're trying to do
- What will be done with this information
- Why we asked you to participate
- If you are a supervisor, we would like to excuse you at this time

2. Explanation of the process

Ask the group if anyone has participated in a focus group before. Explain that focus groups are being used more and more often in health and human services research.

About focus groups

- We learn from you (positive and negative)
- Not trying to achieve consensus, we're gathering information
- No virtue in long lists: we're looking for priorities
- In this project, we are doing both questionnaires and focus group discussions. The reason for using both of these tools is that we can get more in-depth information from a smaller group of people in focus groups. This allows us to understand the context behind the answers given in the written survey and helps us explore topics in more detail than we can do in a written survey.

Logistics

- Focus group will last about one hour
- Feel free to move around
- Where is the bathroom? Exit?

3. Ground Rules

Ask the group to suggest some ground rules. After they brainstorm some, make sure the following are on the list.

- Everyone should participate.
- Information provided in the focus group must be kept confidential
- Stay with the group and please don't have side conversations
- Turn off cell phones if possible
- Have fun

4. Turn on Tape Recorder

5. Ask the group if there are any questions before we get started, and address those questions.

6. Introductions

- Go around table: job here, where you were born

Discussion begins, make sure to give people time to think before answering the questions and don't move too quickly. Use the probes to make sure that all issues are addressed, but move on when you feel you are starting to hear repetitive information.

Questions:

1. Let's start the discussion by talking about what makes this hospital a good place to seek medical services from. What are some of the positive aspects of coming to this facility?
2. What are some things that aren't so good about this as a place?
3. What are some of the current challenges in HIV testing
4. Are you aware of the NASCOP guidelines on repeat testing in pregnancy.
5. What are some facilitators and barriers to the implementation of the guidelines.

That concludes our focus group. Thank you so much for coming and sharing your thoughts and opinions with us. We have a short evaluation form that we would like you to fill out if you have time. If you have additional information that you did not get to say in the focus group, please feel free to write it on this evaluation form.

Materials and supplies for focus groups

- Sign-in sheet
- Consent forms (one copy for participants, one copy for the team)
- Evaluation sheets, one for each participant
- Name tents
- Pads & Pencils for each participant
- Focus Group Discussion Guide for Facilitator
- 1 recording device
- Batteries for recording device
- Extra tapes for recording device
- Permanent marker for marking tapes with FGD name, facility, and date
- Notebook for note-taking

Appendix 4: Letter to IRB

DR MOLLA ADELENE APONDI LOLLAH

(MBCbB)

H58/81124/15

MMed Paediatrics and Child Health

The Chairperson,
Ethics, Research and Standards Committee,
Kenyatta National Hospital and University of Nairobi,
P.O. Box 20723,
Nairobi

Thro'

The Dean,
College of Health Sciences

Thro'

The Chairperson,
Department of Paediatrics and Child Health

Dear Sir/Madam,

RE: SUBMISSION OF MASTERS DEGREE RESEARCH PROPOSAL FOR APPROVAL

I wish to submit my research proposal for approval by your esteemed committee. I am currently a second year student pursuing a Master's Degree in Paediatrics and Child Health at the University of Nairobi, College of Health Sciences.

Yours Sincerely,

Dr. Lollah Adelene Apondi Molla
Department of Paediatrics and Child Health
College of Health Sciences
University of Nairobi

LETTER TO THE FACILITIES

Mollah Adelene Apondi Lollah

Reg No. H58/81124/15

University of Nairobi

College of Health Sciences

P. O. Box 19676-00202

Kenyatta National Hospital

Nairobi Kenya

Date:

Kisumu County Referral Hospital
The ERC/ Director of Clinical services
P. O. Box 1818,
Kisumu, Kenya

Dear Ms/Mr

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR FACILITY

I am Dr. Molla A. Lollah (student number H31/81124/15), a registered Master's student in the Department of Pediatrics and Child Health at the University of Nairobi.

I am hereby seeking your consent to conduct a study at your facility's Mother and child Clinic. The proposed topic of my research is: HIV testing practices in pregnancy, labor and post natal period in Kisumu County.

The objectives of the study are:

- a. To determine the uptake of repeat HIV testing services after an initial negative test in pregnancy ,labor and the post-natal period in Kisumu County .
- b. To identify the facilitators and barriers to uptake of HIV retesting services.

To assist you in reaching a decision, I have attached to this letter:

- (a) A copy of an ethical clearance certificate issued by the University/Kenyatta National Hospital
- (b) 3 copies of the research proposal

My supervisors are Prof. Dalton Wamalwa, MB.ChB,M.Med (Paed), MPH an Associate Professor in the Department of Paediatrics and Child Health and a Consultant paediatrician .Prof.Ruth Nduati MB.ChB,M.Med (Paed), Professor in the Department of Paediatrics and Child Health and a Consultant paediatrician and Prof Wafula MB.ChB,M.Med (Paed),Professor in the Department of Paediatrics and Child Health and a Consultant paediatrician .

Should you require any further information, please do not hesitate to contact me or my supervisor. Our contact details are as follows:

Name: Dr Molla A Lollah

Mobile Number: 0720831926

Email: apondi3@yahoo.com

Name: Prof Dalton Wamalwa

Mobile Number: 0721239493

Email: dalton@africaonline.co.ke

Upon completion of the study, I undertake to provide you with a bound copy of the dissertation.

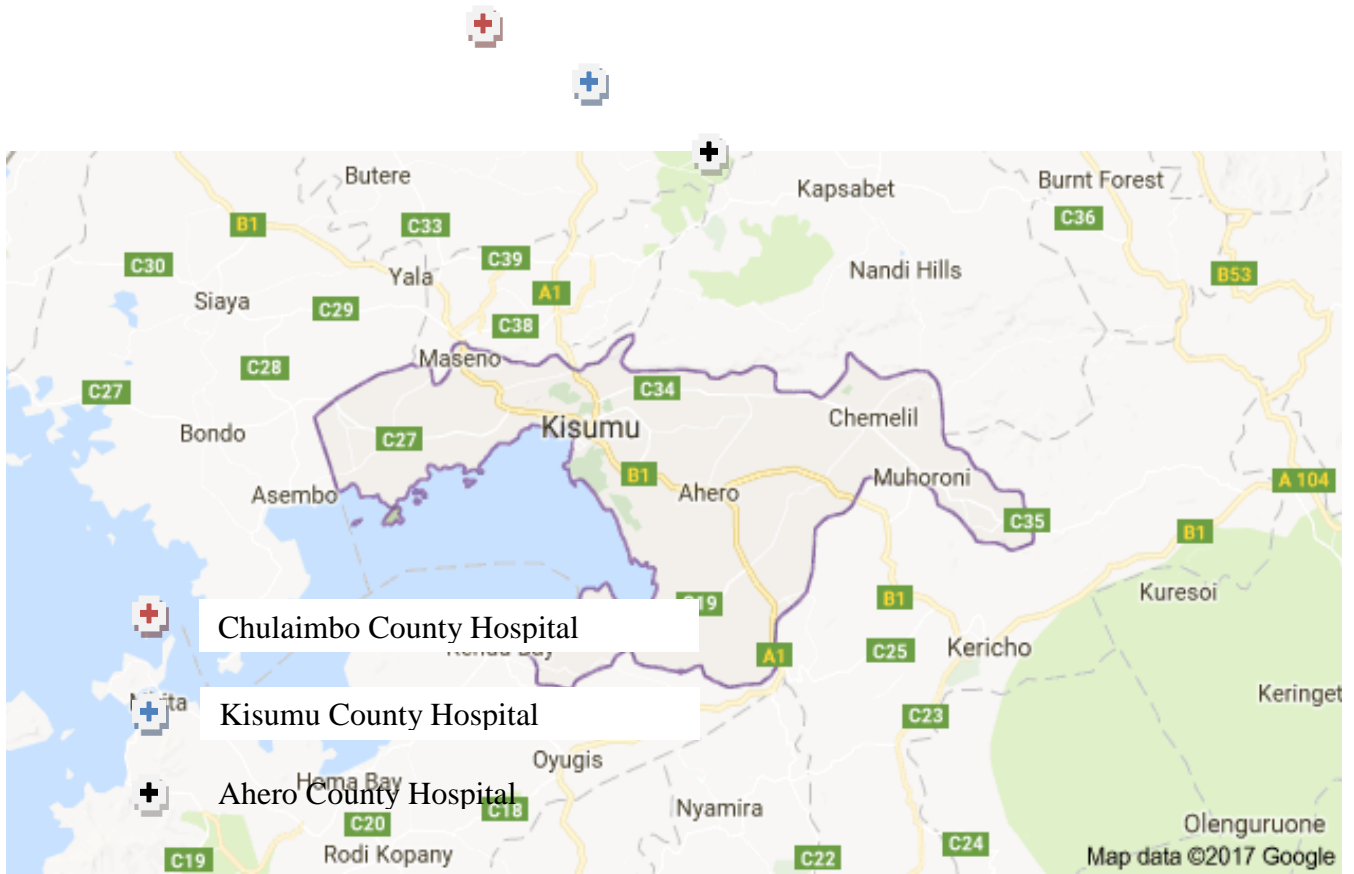
Your permission to conduct this study will be greatly appreciated.

Yours sincerely,

Dr Molla A lollah

H58/81124/15

Appendix 5: Map of Kisumu County: the study sites



Appendix 6: Budget

ITEM DESCRIPTION	COST KSH
Transport	10000
2 research assistants at KSH 8000 each per month for 6 months	96000
Printing of data collection forms	10000
Printing and binding of manuscripts and proposal	5000
Statistician	50000
Printing of posters	2000
Miscellaneous	5000
Total	172000

Appendix 7: Study timelines

Time Frame	2017												2018			
	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April to August
Proposal Development and defense	█	█	█	█	█	█										
Ethical clearance							█	█	█							
Clinical evaluation									█	█	█					
Data collection													█	█	█	
Data Analysis																█
Thesis and manuscript writing and defense																█

Appendix 8: Dummy tables for data analysis

1. Demographics

01	Age(mean and SD)	
02	Level of education(proportions) Primary Secondary Tertiary	
03	Marital status (proportions) Married Single Separated/divorced Widowed	
04	Employment(proportions) Salaried Business Housewife	

2.Obstetric and Gynaecologic history

01	Parity (mean , SD)	
02	Type of delivery(proportions) Skilled Non- skilled	
03	Modes of delivery (proportions) CS SVD	

3. Antenatal Care

01	Time when attended the 1 st ANC(proportions) 1s trimester 2 nd trimester 3 rd trimester	
02	No of ANC visits(mean, SD)	
03	1 st HIV test(mean, SD)	
04	Repeat HIV test(mean SD)	

4. Cross tabulations of factors and Outcomes-Repeat tests

		Chi square
01	Level of education(proportions) No formal education Primary Secondary tertiary	
02	Marital status(proportions) Married Single Separated/divorced widowed	

03	Type of delivery(proportions) Skilled Non-skilled	
04	Mode of delivery (proportions) SVD CS	
05	No of ANC	