AWARENESS OF REPEAT ANTENATAL HIV TESTING IN MOTHERS SIX WEEKS POSTNATAL AT CHILENJE CLINIC, LUSAKA

BY

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DECLARATION

I hereby declare that this dissertation represents my own work and has not been presented either wholly or in part for a degree at the University of Zambia or any other University.

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APPROVAL

This proposal of Dr Agnes Mtaja has been approved as fulfilling the requirement of the award of the Degree of Master of Medicine in Paediatrics and Child Health by the University of Zambia.

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ABSTRACT

Zambia national guidelines on the Prevention of Mother to Child Transmission (PMTCT) recommend that all pregnant women and breastfeeding mothers must have HIV tests every 3 months. However, less than 10% of pregnant women in Lusaka District get retested. Repeat HIV testing identifies women who seroconvert after the first test and allows measures to reduce mother to child transmission to be instituted. **Objectives:**This cross-sectional survey aimed at investigating the effect of awareness of repeat testing on actual retesting in women attending the 6th week post-natal clinic at Chilenje Health Centre in Lusaka. The objectives of the study were to determine the proportion of women that were aware of the repeat antenatal HIV testing, the number of women that were retested later in pregnancy or labour, and the number of postnatal mothers who seroconverted during the study. **Methods** :Questionnaires were used to assess awareness and mothers eligible for a repeat test were offered a repeat test. 404 mothers at the sixth week postnatal visit were recruited by convenient sampling. Only women that had proof of a negative HIV test result in pregnancy were included in the study. Data was stored on Epidata and analysed using stata. Chi squares were used to make associations between the categorical variables and the primary outcome, repeat testing. Multivariate logistic regressions were used to adjust for confounders.**Results:** Out of the 404 women that participated in the study, 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. None of the women that received a repeat test during the study (289) seroconverted. Awareness was significantly associated with repeat testing (Odds ratio 3.8; 95% CI 2.9 – 6.9).**Conclusion:** Women that are aware of repeat antenatal HIV testing are four times more likely to receive a repeat test than those that are not. Booking in the first trimester increases the chance of being retested two fold. Women that have 5 or more ANC visits have a three-fold chance of being retested than those with fewer visits.

DEDICATION

To my best friend and husband Kabisa Mwala: Honey your encouraging words keep me going. You are my inspiration.

To my beautiful Diana and Ruth: After enduring many nights of mummy's absence, it is time to play, love you girls

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ABBREVIATIONS AND ACRONYMS

AIDS……..Acquired Immunodeficiency Syndrome

ANC……..Antenatal Clinic

ART……..Anti-Retroviral Therapy

HCP……..Health Care Provider

HIV……Human Immunodeficiency Virus

MTCT……..Mother-to-Child Transmission

PCOE……Pediatric Center of Excellence

PMTCT ……Prevention of Mother-to-Child Transmission

UNAIDS……..United Nations Joint Program on HIV/AIDS

ZEPRS…..Zambia Electronic Perinatal Record System

CHAPTER ONE

1.1 INTRODUCTION

HIV is the leading cause of mortality among women of reproductive age worldwide and is a major contributor to maternal, infant and child morbidity and mortality.[1] It is the leading cause of death among children in low and middle income countries. It has caused widespread suffering and reversal of developmental advances in the hardest hit areas of sub-Saharan Africa.[2]

The HIV epidemic has had a devastating effect on children. In 2011, an estimated 330,000 children contracted HIV during the perinatal and breastfeeding period.[3] About 90% of HIV infected children live in sub-Saharan Africa.[4,5] Without treatment one third of children living with HIV die before they reach one year of age and over 50% die by the 2nd year of life.[6]

Mother-to-Child Transmission (MTCT) is by far the largest source of Human Immunodeficiency Virus (HIV) infection in children below the age of 15 years. According to the Joint United Nations Program on HIV/AIDS (UNAIDS) estimates, more than 90 percent of children who acquire the virus through Mother-to-Child Transmission, do so before birth, during birth, or through breastfeeding.[2]

The 2010 Zambia National PMTCT Programme (adapted from WHO recommendations) uses an opt-out approach for HIV testing. The opt-out approach means that HIV testing is part of the routine laboratory testing undertaken during all pregnancies.

When a woman tests HIV positive, she is offered an opportunity to enrol in the PMTCT programme. Pregnant women who test HIV negative early in pregnancy are offered an opportunity to retest later during the 3rd trimester or soon after delivery.[7] The current guidelines also recommend HIV testing of HIV uninfected breastfeeding mothers every 3 months, in order to identify seroconverters and to enable health workers provide the necessary care to prevent Mother-to-Child Transmission through breastfeeding. The PMTCT programme in Zambia has been in place since 1999.

The current interventions in Zambia which include provision of anti-retroviral drugs to the HIV positive pregnant woman from 14 weeks gestation, antiretroviral drugs to the infant within 72 hours after birth, and other intra-partum and post-partum measures, can reduce the risk of MTCT from an overall 40% to less than 5%.[7]

Therefore, transmission of HIV from a pregnant woman to her infant is preventable. Effective provision of PMTCT interventions improves maternal health and infant HIV – free survival.[1]

Without intervention, 25 – 40% of infants born to HIV positive mothers will become infected. Five to ten percent of infected children will be as a result of transmission during pregnancy (in utero), ten to twenty percent during labour (intra-partum), and five to ten percent through breastfeeding (post-partum).[8]

Recent reports have documented alarmingly high rates of HIV seroconversion during pregnancy and the early post-partum period in sub-Saharan Africa. The following data (on HIV incidence in number of new infections per 100 person years) are from studies that performed repeat peri-partum HIV testing about 12 weeks and 60 weeks after the first test in women who tested negative for HIV earlier in pregnancy (generally early in the second trimester). Uganda reported HIV incidence of 2.3 per 100 person years,[9] while South Africa reported 10.7 new infections per 100 person years,[10] Kenya reported 6.8 new infections[11] and Swaziland, which has the world's highest prevalence, had an astounding 16.75 new infection per 100 person years.[12]

In a study done in Harare, Zimbabwe, an incidence of 5.7 per 100 woman years was found at nine months post partum.[13] Sagay et al in a Nigerian study found a seroconversion rate of 2.1% (5 of 235 women) in women who had previously tested negative for HIV during the index pregnancy.[1]

MTCT prevention programmes are effectively reducing child transmission among mothers with known HIV infection. In settings with high HIV incidence, new maternal infections may actually be responsible for a substantial proportion of the MTCT of HIV. For example, it has been estimated that MTCT secondary to seroconversion during pregnancy could account for more than 40% of all ongoing MTCT in Botswana.[15]

Several studies have stressed the need for a retest later in pregnancy to identify seroconverters, bearing in mind the fact that women who test negative in early pregnancy remain at risk of acquiring HIV, and also the fact that the risk of transmission to the infant is very high with new infection.[1,16-19]

A panel of experts has advocated that retesting HIV negative women in late pregnancy is important to detect recent seroconverters who are likely to have high plasma viral loads and an increased risk of MTCT.[1, 20-21]

The prevalence of HIV in pregnant women in Zambia is about 16.4%. Therefore, the majority of pregnant women who participate in the PMTCT programmes are HIV uninfected. Keeping these seronegative women uninfected is an important component of efforts to eradicate paediatric HIV infections.

This study is important because data obtained on awareness of repeat testing will strengthen efforts being made to prevent primary infection. For example if it is found that the majority of women are aware of the need for a repeat antenatal HIV test but for personal reasons do not seek a repeat test, strategies to change the people's mindset will have to be instituted, as well as ensuring that health workers adhere to the guidelines.

1.2 REVIEW OF LITERATURE

Globally, the number of new HIV infections has fallen by 19%. In certain sub-Saharan countries, Zambia included, incidence has fallen by more than 25%. This trend has been attributed to a combination of factors such as prevention efforts (PMTCT, behavioral change etc) and the natural course of the HIV epidemic. (UNAIDS Report 2010).[22]

Mother-to-Child HIV transmission has declined dramatically in the developed world in the last 2 decades, ranging from 1.2% to 2.6%.[23] MTCT rates below 2% have been achieved using combination antiretroviral therapy (ART), elective caesarean section and avoidance of all breastfeeding.[16,24–26]

These low transmission rates have been demonstrated even in low income countries when all the above measures are taken to prevent MTCT.[27-29] A survey of babies tested for HIV during routine immunizations in South Africa's KwaZulu Natal Province showed the six week vertical HIV transmission rate was 7% in 2008/2009 compared to 20.8% in 2004/2005. This dramatic reduction was largely due to an increase in testing, counselling and treatment.[30'31]

An estimated 1.4 million pregnant women in low and middle income countries are living with HIV. Ninety percent of these women are in sub-Saharan Africa. Only an estimated 21% of pregnant women received an HIV test in 2008 and 45% received drugs to prevent mother to child transmission.[2]

This is a huge shortfall from the UN target of 80% by 2010.[30] While this represents an increase from 10% in 2004, it remains far too low to allow a population response to impact the paediatric HIV epidemic in resource limited countries.[2]

Despite evidence for effective ways to prevent MTCT of HIV, transmission rates remain high even in settings where there has been widespread implementation of PMTCT programmes.[27]In resource rich countries, a significant proportion of the remaining MTCT may be among women having acquired HIV infection during pregnancy.[32] With the provision of antiretroviral treatment, this trend is expected to be seen in the developing countries as HIV becomes a chronic infection.

Acute maternal HIV infection during pregnancy and breastfeeding is associated with MTCT rates of up to 50% or higher in breastfeeding populations.[33] Approximately one third of infants whose mothers seroconvert following delivery will become infected through breastfeeding alone.[34-35] These high transmission rates make sense because maternal viral load is the most consistent predictor of MTCT of HIV infection,[17,36] and acute HIV infection is associated with very high levels of HIV RNA.[37-38]

Increased risk of HIV acquisition during pregnancy, coupled with initial levels of viral replication during acute infection, including in genital secretions, could make pregnancy itself a mechanism for efficient transmission of HIV from pregnant women to their infants.[1]

A study in Kenya by Kinuthia et al found that the HIV incidence during pregnancy was as high as in cohorts of sex workers,[11] indicating that pregnant women are a high risk group for seroconversion. Much of this seroconversion is unrecognized and therefore intervention is not instituted.

Moodly D et al found that HIV incidence was 4 times higher in pregnant women than in the general population. They noted that HIV retesting late in pregnancy or labour offers an additional opportunity to prevent Mother-to-Child transmission and further horizontal transmission in the community.[10]

Retesting in later pregnancy is still low as illustrated by Keiffer et al who found that only 14 percent of pregnant women had retested in their control sites compared to 45% at intervention sites.[12]

A Study of Missed Opportunities by Kankasa et al with a sample size of 2669 mother/infant pairs (infants aged between the ages of 1 month to 1 year) showed that 21% of the women tested HIV positive, and that repeat testing during pregnancy in women that initially tested negative was done only in 6.2%. (Unpublished data)

Data from 6 clinics around Lusaka (Zambia Electronic Perinatal Record System - ZEPRS data base), collected between 2009 and 2010 clearly shows that repeat testing in pregnancy stands at a minimum, despite the fact that it is a recommendation in our PMTCT National Guidelines. The average percentage of mothers retested in all clinics throughout Lusaka District is only 10.5%.

Chilenje clinic recorded 1454 mothers seen at least once for antenatal care between January to June 2010. Ninety percent of these women agreed to be tested for HIV, and of these 84% were HIV negative. (ZEPRS). At 11.2%, Chilenje Clinic retested the most of all the Clinics in Lusaka District. This, plus its convenient proximity to the University Teaching Hospital were the reasons it was selected as a study site.

Barriers to uptake and implementation of PMTCT services were numerous in various studies and ranged from personal reasons, for example, knowing one's own HIV status, fear and stigma, low PMTCT knowledge, to health service obstacles like negative attitudes of health workers, lack of supplies, inadequate personnel, and poor infrastructure.[1,39-41]One important barrier to PMTCT is poor antenatal clinic attendance.[1]

In an Indian Study by Gita et al, barriers to HIV testing during pregnancy included lack of discussion by antenatal care providers and lack of awareness of existing testing services.[42]

1.3 STATEMENT OF THE PROBLEM

Prevention of Mother-to-Child transmission begins with identification of an HIV positive pregnant woman. Each new HIV infected child represents a missed opportunity for prevention.

Uptake of the 1st antenatal service in low and middle income countries is high, with nearly 80% of women being seen at least once during pregnancy, representing a valuable opportunity for the implementation of PMTCT.[30]

The UNICEF statistics for Zambia show that antenatal care coverage for at least one visit (2003-2008) stands at 94%, and then drops sharply to 60% for at least 4 visits. [43]

The more contact the Health Care Provider (HCP) has with the pregnant woman, the more opportunities the HCP has to offer a retest. Since antenatal coverage for 4 visits is only 60%, contact with the HCP is considerably reduced.

One of the major barriers identified to effective PMTCT programs is the low antenatal attendance. Pregnancy is a limited period and if opportunities for HIV testing are missed during pregnancy, the immediate postnatal period can be used to identify seroconverters as most women bring their children for vaccines at the postnatal clinic.

As noted earlier, retesting rates in Lusaka district only average 10.5%. This is evidenced by the fact that at the University Teaching Hospital, our tertiary institution, HIV still accounts for a significant number of paediatric admissions (23% in 2005 and 18% in 2010 - Pediatric Center of Excellence (PCOE) data).

The above retesting rates are too low to translate into an effective PMTCT programme. It is therefore imperative to address the barriers that may be contributing to these low retesting rates, one of which could be low levels of awareness.

1.4 STUDY JUSTIFICATION

Zambia has well formulated National PMTCT guidelines that encourage initially HIV negative pregnant women to retest later in pregnancy. Repeat testing of antenatal HIV negative women rarely occurs in practice, an average of 10% in all clinics in Lusaka. As a result, the woman who will seroconvert will be unidentified and pose a high risk of transmitting HIV to her infant.

Ironically, it appears a child is safer when the mother tests HIV positive as she and her baby are more likely to receive all the intervention strategies to prevent mother to child transmission. More attention needs to be given to the HIV negative pregnant woman, as there is a higher chance that she will transmit the virus to her baby in the event that she becomes infected later in pregnancy.

It is important to assess awareness of the repeat test in pregnant women and its effect on actual retesting as this will identify issues related to the non implementation of these guidelines. This will allow for appropriate interventions to be carried out and more children will be saved from being infected with HIV, otherwise eradication of paediatric HIV will remain an unattainable goal.

1.5 STUDY QUESTION

How does awareness of repeat antenatal HIV testing affect the uptake of actual repeat testing?

CHAPTER TWO

2.1 MAIN OBJECTIVE

To assess the effect of maternal awareness of repeat antenatal HIV testing on actual repeat testing in women attending the 6th week post-natal clinic at Chilenje Health Centre, Lusaka

2.2 SPECIFIC OBJECTIVES

1) To ascertain the proportion of postnatal mothers that were counseled about repeat antenatal HIV testing
2) To determine the proportion of mothers retested later in pregnancy or labour
3) To determine the proportion of postnatal mothers who will have seroconverted by the 6th week postnatal visit

CHAPTER THREE

METHODOLOGY

3.1 STUDY DESIGN

This was a cross sectional study

3.2 TARGET POPULATION

All postnatal mothers attending Maternal Child Health Clinic (MCH) at Chilenje Clinic in Lusaka

3.3 STUDY POPULATION

Postnatal mothers who previously tested negative for HIV, that attended clinic for the six week postnatal visit, and met the inclusion criteria.

3.4 STUDY SITE

The study was conducted at Chilenje Clinic, at its Maternal and Child Health department, in Lusaka, Zambia. Chilenje Clinic is located in the South-eastern part of Lusaka. It covers a catchment area of about 77,142 residents. It offers out-patient as well as in patient services (bed capacity is 30). It has the following clinics: Maternal and Child Health and Antiretroviral clinics. It also has several 'corners' that cater for patients with sexually transmitted diseases and tuberculosis. It has a youth friendly corner to cater for the youth. It has a labour ward that has a capacity of 4 beds.

It has a basic laboratory and also has a pharmacy. It keeps its relevance in the community via the community health workers who are community volunteers. It has an ambulance to facilitate transfer to higher level hospitals. Until now, Chilenje has operated as a Clinic, but is now earmarked for a first level Hospital where caesarean sections and other minor surgical operations will be done.[44]

3.5 SAMPLE SIZE

The following prevalence formula was used to calculate sample size

$$N = \frac{Z^2 \times P(1-P)}{(E)^2}$$

Where

N = sample required

Z =Z statistic =1.96 (95% C I)

P= expected prevalence 0.5 (assuming 50% of the women are aware)

E= confidence interval 0.05

Therefore $N = \frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2}$

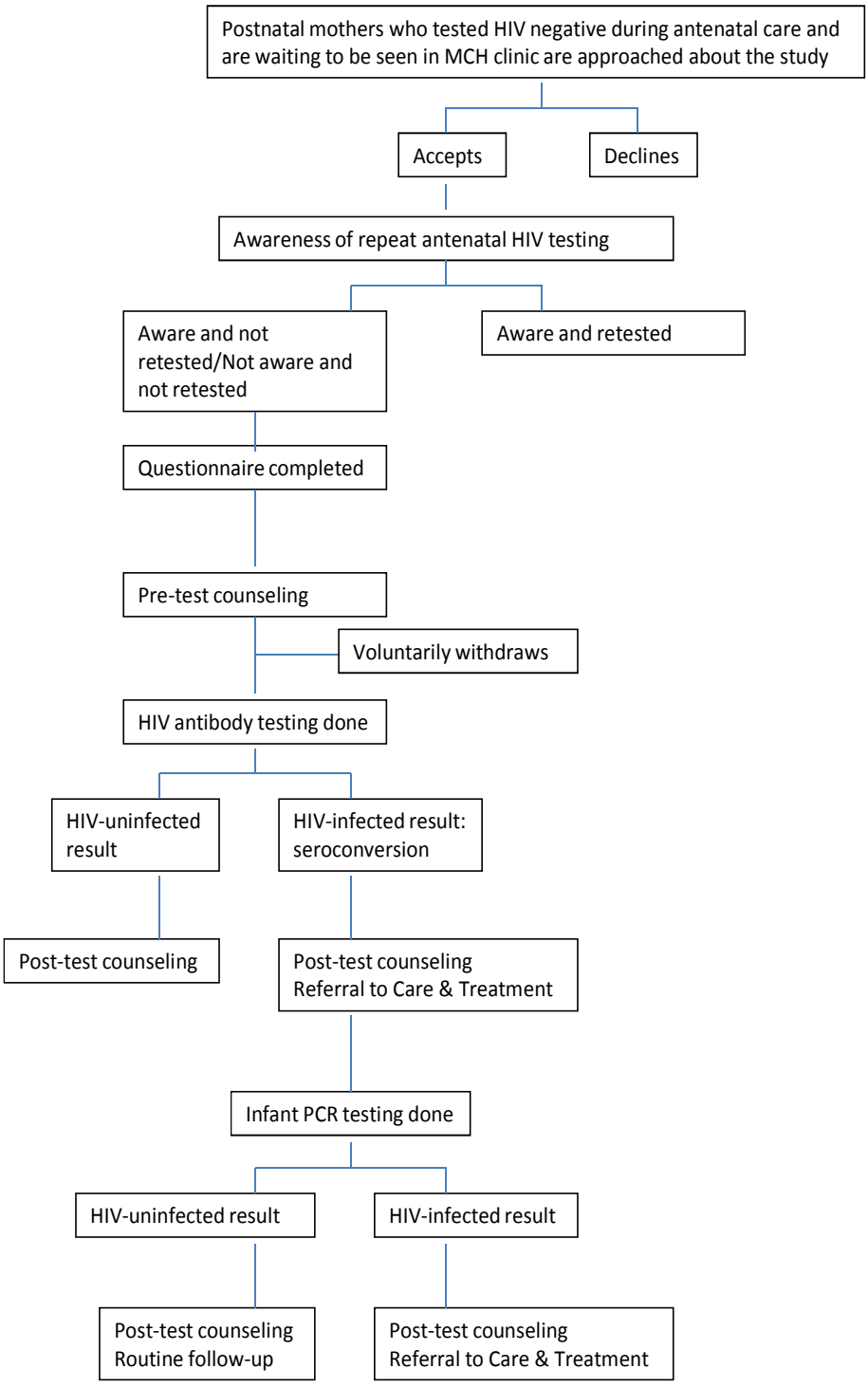
= 384

Total sample size considering a fall out of 5% = 384/(1-0.05) =404 mothers

3.6 SAMPLING METHODS

The convenient sampling method was used. All mothers attending the Chilenje Maternal and Child Health Clinic were invited to join the study. If a mother declined to be enrolled, the next mother was approached. The mothers were assessed for eligibility and sought their consent to be enrolled in the study. A questionnaire was administered to assess awareness. Pre-test counseling and rapid HIV antibody testing was carried out on the mothers using the Abbot Determine test kit (Abbot Diagnostics). Blood samples were obtained from either the thumb or the ring finger using a lancet. Only two drops of blood were required. Samples that were reactive were confirmed with Unigold test Kit (Trinity Biotech PLC, Ireland), as described in the Zambia HIV rapid Test Algorithm. Dried blood spots were to be collected from either the lateral or medial aspect of the heel, or the big toe of the HIV exposed infants for DNA-PCR testing using the Amplicor HIV-1 DNA Test (Roche Molecular Systems, Branchburg, NJ, USA). HIV infected mothers and their babies were to be referred to the ART clinic. Enrollments were done on Mondays to Fridays in the morning from June 2012 to December 2012.

Figure 1: Flow Chart of Procedure



3.7 ELIGIBILITY

3.7.1 INCLUSION CRITERIA

All postnatal mothers with proof of being HIV negative antenatally in the first and second trimester that presented to Chilenje clinic at the 6th week postnatal visit during the study period. Proof of HIV negativity was obtained from the antenatal card or the clinic database.

3.7.2 EXCLUSION CRITERIA

All mothers who declined to join the study.

3.8 VARIABLE DESCRIPTIONS

3.8.1 DEPENDENT VARIABLES

Primary outcomes – (1) Awareness of HIV retesting during pregnancy

(2) Repeat testing during pregnancy

(3) Seroconversion during pregnancy

Secondary outcomes – (1) Number of HIV infected infants following seroconversion of their mothers

(2) Acceptors of repeat HIV testing

3.8.2 INDEPENDENT VARIABLES

- Residence
- Religion
- Age
- Marital status
- Education
- Occupation
- Economic status
- Mode of feeding
- Parity
- Gestational age at booking
- Number of Antenatal Clinic visits
- Antenatal RPR testing
- Antenatal provision of anti-malarial prophylaxis, haematinics, deworming drugs and tetanus toxoid
- Mode of transportation to ANC
- Place of Delivery
- All the reasons for not retesting

3.9 DATA MANAGEMENT

Research assistants were trained to ensure uniformity of data collection.

A standardized data entry questionnaire for each study participant was used for data collection. Mothers were identified by numbers and no personal details that may help identify participants appeared on the form. Data was entered on an Epidata version 3.1 database.

Routine monitoring of data collection tools was done by means of once daily spot checks for completeness and errors.

3.10 STATISTICAL ANALYSIS

The data was analyzed using Stata version 11. Frequency tables were used to describe the socio-demographic characteristics. Chi-square tables were used to test for associations for categorical variables, while t-tests were used to make associations for continuous variables. The effect size was measured using odds ratios. Univariate logistic regression was used to associate awareness of repeat testing with actual repeat testing. Multivariate logistic regressions were used to adjust for confounders.

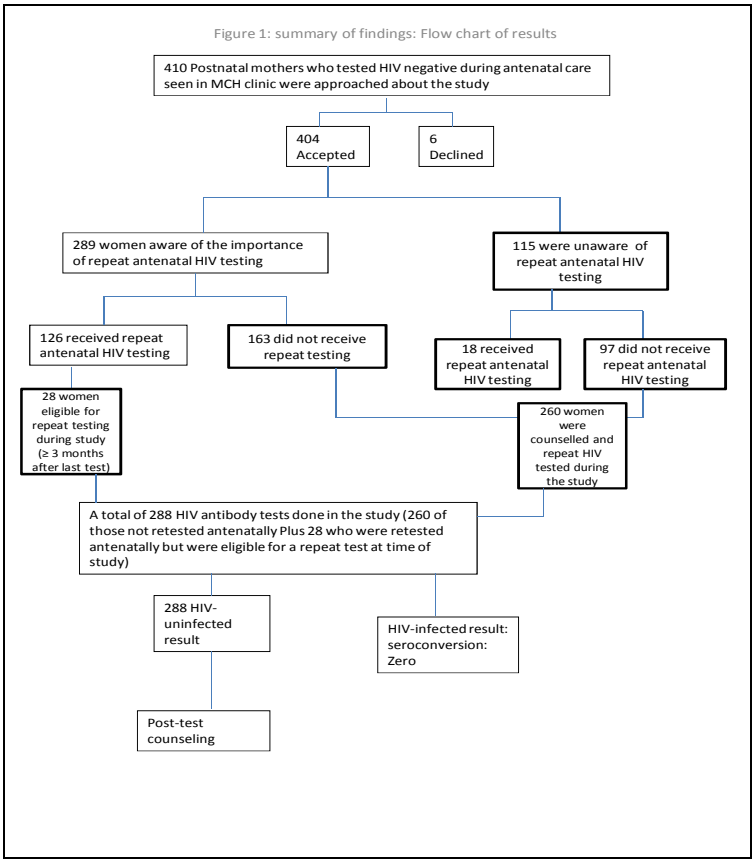
3.11 ETHICAL ISSUES

Ethical clearance was sought from the University of Zambia Biomedical Research Ethics Committee and permission to conduct the study was given in June 2012. Permission to carry out the study was sought from the Lusaka District Health Office and permission was granted. The purpose and procedures of the study were fully explained and a written informed consent was obtained from all the mothers, including those that were below the age of 18 as these were considered to be emancipated minors. It was emphasized that participation in the study was purely voluntary and that participants were free to withdraw from the study at any point. The risks (such as psychological trauma in the event that a mother seroconverts, slight discomfort from the needle prick), and benefits (such as knowledge of current HIV status, additional knowledge on how to remain HIV negative, immediate and appropriate help in case of seroconversion) were fully explained to the participants as described in the consent form (see appendix B). In order to minimize the risks, trained and experienced counselors conducted pretest counseling, testing and posttest counseling. Patient results were treated as strictly confidential. All data entry forms were identified by coded numbers only. The data entry sheets were locked in a secure cabinet and all electronic entries were password protected.

CHAPTER FOUR

4.1 RESULTS

Out of the 410 mothers that were invited to be in the study, 404 agreed to be included in the study. All the 404 respondents were included in most parts of the analysis as appropriate.



DESCRIPTIVE DATA OF THE MOTHERS

4.1.1 SOCIO-DEMOGRAPHICS

The socio-demographics of the participants are summarized in table 1.

Table 1 Summary of socio-demographics. n=404

Variable	Number (frequency)	Percentage
Age (In yrs)		
Mean age = 26.3		
15 - 24	172	43%
25 -34	201	50%
>35	31	7%
Marital status		
Single	72	18%
Married	332	82%
Residence		
Low cost	30	7%
Medium cost	322	80%
High cost	52	13%
Religion		
Catholic	89	22%
Protestant	315	78%
Level of Education		
None	7	2%
Primary	53	13%
Secondary	227	56%
Tertiary	117	29%
Occupation		
Formal	100	25%
Self	48	12%
Unemployed	256	63%
Economic Status		
<ZMK1million	136	34%
ZMK 1-2million	101	25%
>ZMK 2million	167	41%

The mean age of the mothers was 26.3 years (21 - 31.6). The youngest was 15 years old while the oldest was 43 years old. The majority of the respondents (50%) were in the age category 25 to 34 years. This was followed by 43% of the mothers falling in the age range 15-24 years. Only 7% of the women were above 35 years.

Most of the respondents (56%) had attained up to secondary education. Twenty nine percent (29%) had attained up to tertiary education. Thirteen percent (13%) had primary education and only 2% had no education at all.

Most women (63%) were unemployed. Twenty five percent (25%) were formally employed while 12% were self employed.

The majority of the respondents (41%) earned more than K2million per month, followed by those that earned less than K1million (34%).

Twenty five percent (25%) earned between one and two million Kwacha. The Income was the household income (from both husband and wife).

The majority of the respondents were from the medium cost residential area (80%), Chilenje and Libala. The low cost accounted for 7%, while 13% of the respondents lived in the high cost residential area.

The majority of the women (82%) were married while 18% were single. There were no separated, divorced or widowed respondents.

4.1.2 ANTENATAL

The antenatal data of the participants is summarized in table 2.

Table 2 Summary of antenatal data

Variable	Number (frequency)	Percentage
Parity		
Uniparous	141	35%
Multiparous	239	60%
Grand multiparous	19	5%
Booking		
1st Trimester	66	16%
2nd Trimester	307	76%
3rd Trimester	31	8%
Number of routine visits		
1 – 2	64	16%
3 – 4	250	62%
5+	90	22%
Place of delivery		
Home	18	5%
Clinic	220	54%
Hospital	166	41%
Mode of transport to antenatal clinic	134	33%
Car	101	25%
Bus	167	41%
Walking	2	1%
Cycling		

The mean number of pregnancies was 2 (1 – 3), the minimum being one and the maximum ten. Most women (59%) were multiparous, that is, had had between 2 to 4 pregnancies. A significant number (35%) were uniparous while only 5% were grand multiparous having had more than 5 pregnancies.

The mean gestational age at booking was 19.4 weeks (13.7 – 25.1). The minimum gestational age at booking was 4 weeks and the maximum was 36 weeks. The majority of the women (76%) booked in the second trimester followed by 16% booking in the first trimester. Very few (8%) booked in the third trimester.

The mean number of routine antenatal visits was 3 (2 – 5), with the minimum at one visit and the maximum at nine visits.

Most women (62%) had at least 3-4 antenatal visits. 22% had five or more visits while 16% had one to two visits.

Most women (54%) delivered at the clinic while 41% delivered at the hospital. Only 4% delivered at home. Of the clinic deliveries, 173 (45%) delivered at Chilenje Clinic, while 27 (7%) delivered at Bauleni Clinic. Twenty-two women (5%) delivered in the private hospitals. One hundred and thirty three mothers (35% of the total deliveries) delivered at the University Teaching Hospital.

The routine interventions that the mothers received in the antenatal period are summarized in table 3.

Table 3 ANTENATAL INTERVENTIONS

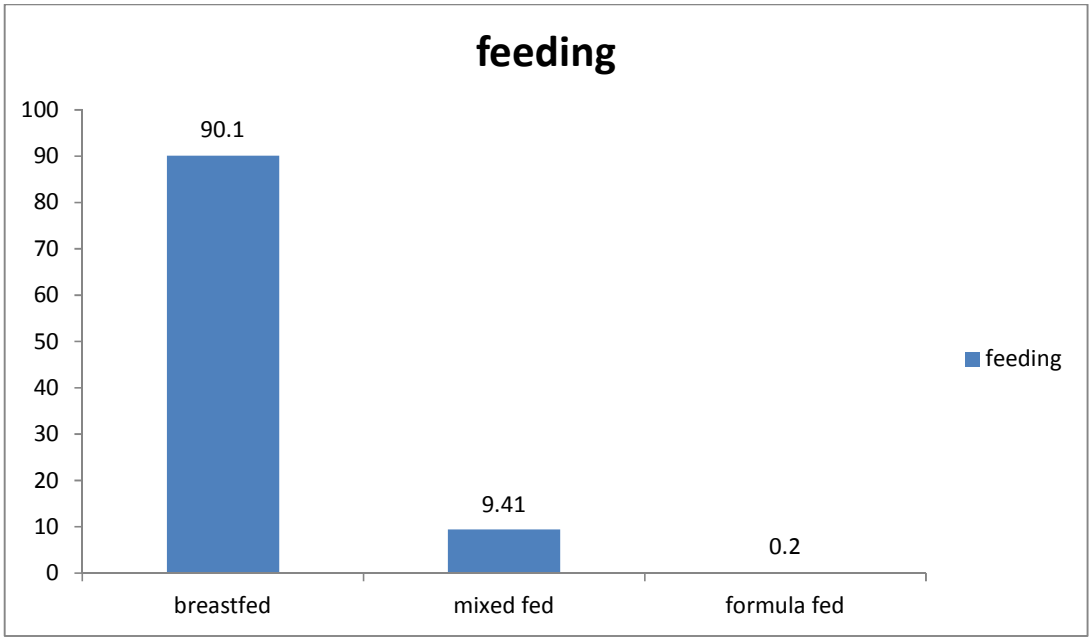
Variable	Number (frequency)	Percentage (%)
RPR		
Tested	369	91%
Not tested	35	9%
Negative	366	99%
Positive	3	1%
Antimalarials		
Received	402	99%
Not received	2	1%
Haematinics		
Received	401	99%
Not received	3	1%
Deworming		
Received		
Not received	376	93%
	28	7%
Anti-tetanus		
Received		
Not received	398	98%
	6	2%

Three hundred and sixty nine out of four hundred and four (91%) were tested for syphilis. Thirty five mothers were not tested mostly because there were no reagents for RPR testing at the clinics where they booked. Of those tested 99% were RPR negative and only 1% tested positive.

4.1.3 DESCRIPTIVE DATA OF THE INFANTS

Almost all the infants were six weeks of age. Only two were seven weeks. There was an equal distribution between girls and boys (1:1). Most women (90%), breastfed their babies. Nine percent (9%) mixed fed their babies while only one mother exclusively formula fed her baby. This is shown in Graph 1.

Graph 1 Showing feeding of the infants



4.1.5 DESCRIPTION OF OUTCOMES

1) Primary Outcomes

Table 4 shows the results of the primary outcomes

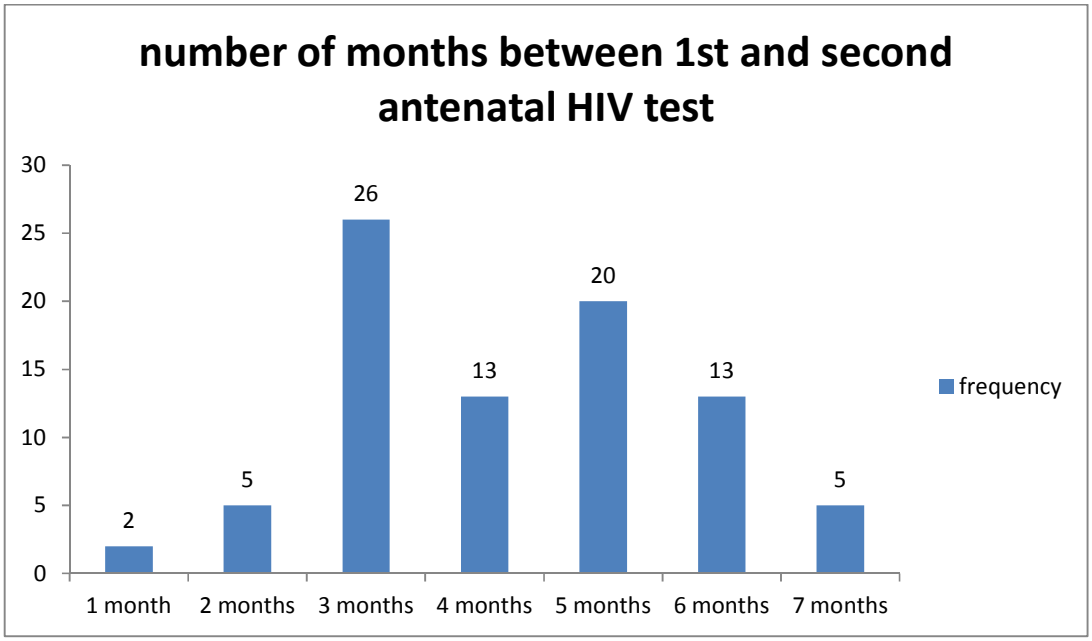
Outcome	Frequency	Percentage (%)
Awareness		
Aware	289	72%
Not aware	115	28%
Repeat testing		
Received retest	144	36%
No retest	260	64%
Seroconversion	Nil	Nil

The majority, 72% of the respondents were aware of repeat HIV testing in the antenatal period. Only 28% were not aware.

One hundred and forty four (36%) received repeat HIV testing antenatally while most mothers (64%) did not have a repeat test. Of those that had a repeat test, only 39% had a repeat test within 3 months of having the first test.

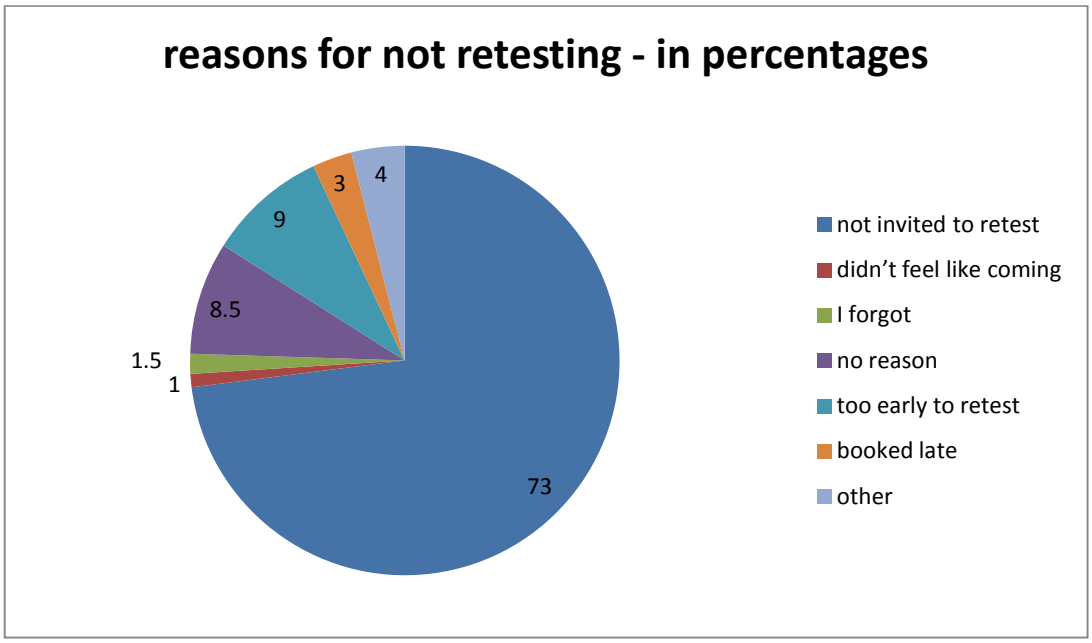
The number of months between first and second HIV test is shown in Graph 2 below.

Graph 2 showing number of months between first and second antenatal HIV test



Several reasons for not receiving a repeat test were given. Graph 3 shows most of the reasons given by the 260 mothers that were not retested.

Graph 3



Note: n =268; 8 more than the 260 women retested during the study because a few women gave more than one reason for not retesting. The number of participants offered a repeat test (292) is more than the number of mothers that did not have a repeat test in the antenatal period (260) because some mothers who had repeat testing antenatally were eligible for another test at the time of the study. Finally only 288 mothers were retested in the study as out of 292 offered restesting, 4 declined.

None of the women retested in the study seroconverted. All the 288 women remained sero-negative for HIV.

2) Secondary outcomes

Table 5 shows the summary of the secondary outcomes

Outcome	frequency	Percentage (%)
Acceptors of the repeat test		
Accepted	288	99
Declined	4	1

Note: *As there were no mothers that seroconverted, no infants were tested for HIV.*

4.1.6 ANALYTICAL DATA

EFFECT OF AWARENESS ON REPEAT TESTING

The following tables show that awareness of repeat testing was statistically significantly associated with actual repeat testing ($p < 0.0001$). Women that were aware of the importance of repeat antenatal HIV testing were 4 times more likely to receive a repeat test than those that were unaware. (OR 4.16, 95% CI 2.39 -7.25)

Table 6 chi square table showing association of awareness with repeat testing

Awareness of repeat testing	**Repeat HIV testing**		**Total**
	0	**1**	
0	97	18	115
	84%	16%	100%
1	163	126	289
	56%	44%	100%
Total	**260**	**144**	**404**
	64%	**36%**	**100%**

Table 7 logistic regression showing association of awareness with repeat testing

Repeat HIV testing	**Odds Ratio**	**Standard Error**	**95% Confidence interval**
Awareness of Repeat testing	4.16	1.18	2.39 - 7.25

The following table shows the results of the effect of awareness on repeat testing after adjusting for confounders

Table 8 Adjusting for confounders

Variable	**Odds ratio**	**P value**	**95% confidence interval**
Awareness			
Potential confounding variable			
1**) Education**			
- Primary	0.40		
- Secondary	0.83		
- Tertiary	2.11	0.001	1.34 – 3.34
2) **Gestational age at booking**			
- First trimester	3.3	<0.0001	1.87 – 5.81
- Second trimester	0.45		
- Third trimester	0.7		
3) **Number of ANC visits**			
- 1 to 2 visits	0.53		
- 2 to 4 visits	0.50		
- 5+ visits	3.8	<0.0001	2.29 – 6.33

Table 9 - Multivariate analysis

rhiv	Odds Ratio	Standard Error	95% confidence Interval		
aw	3.89	1.14	2.19	-	6.90
ft	2.34	0.73	1.29	-	4.31
Av5	3.11	0.84	1.83	-	5.29

rhiv = repeat HIV testing; aw = awareness of repeat testing; ft = first trimester; av5 = 5+ ANC

After adjusting for confounders, awareness of repeat antenatal HIV testing remained significantly associated with repeat testing (OR 3.89, $p < 0.0001$; CI 2.19 – 6.90).

Booking in the first trimester and having five and more ante natal clinic visits were independently significantly associated with repeat testing as shown above.

CHAPTER FIVE

5.1 DISCUSSION

This study investigated the effect of awareness of repeat antenatal HIV testing on actual repeat testing. Seventy-two percent of women were aware of the importance of repeat antenatal HIV testing while only 36% actually received a repeat test antenatally.

All women had received at least one HIV test during pregnancy, and are assumed to have been counselled prior to the test. Therefore, all women were expected to be aware of repeat HIV testing. The women that reported being unaware of the importance of repeat testing were women that probably received inadequate counseling as was seen in the study by Gita et al who found that lack of discussion by antenatal care providers was a major barrier to HIV testing during pregnancy.[42] Unfortunately, not a single counseling session was listened to in order for the counseling to be assessed. However, it was observed that the PMTCT guidelines were present in the clinic and that all but 2 nurses were trained in PMTCT. Women who are aware were 4 times more likely to be retested than those who were not ($p < 0.0001$, CI 2.39 – 7.25). It is possible that these women used the knowledge they had on the importance of repeat testing to request the HIV test.

The results show that an increase in education, five or more antenatal visits and booking in the first trimester are significantly associated with being aware of repeat HIV testing. This makes sense because more contact with a health care provider ensures reinforced information.

A higher number of ANC visits increased the chances of being retested 3-fold. This is comparable to Rouzioux et al and Newell et al who found the converse that poor antenatal attendance translated into low rates of repeat testing.[5,6]

After controlling for confounding factors, awareness still remained significantly associated with repeat HIV testing (OR 3.11; $p<0.0001$, CI 2.39 – 7.25). This is line with what Gita et al found where lack of awareness of services offered at the ANC contributed significantly to the low uptake of these services.[42] Therefore the converse is true that awareness increases uptake as was found in this study.

The study found that 36% of the women were retested during pregnancy. This is higher than the Lusaka district average of 10%. The data was collected over a period of six months and during this time the health care providers were sensitized to the study aim which included active retesting of the postnatal women. This result, therefore, could be a reflection of a ripple effect on other departments of the clinic like the labour ward. A similar effect was seen by Keiffer et al who observed repeat testing at 45% in their intervention sites compared to 14% at the control sites.[12]

In this study, the major reason (in 73% of the participants) for not retesting was that repeat testing was not offered to the women by the health care providers. This was a barrier to a successful PMTCT programme also found by Kinuthia et al, who cite a strain on an over-stretched human resource base.

Interestingly, unavailability of counsellors, counsellors being too busy, counsellors being rude, mothers being told to come back with partner and long queues at the

ANC were not major issues in being reasons why mothers did not retest, with these parameters accounting for the 'other' category (7%) of the responses. It was observed, however, that there were at most 4 nurses in the maternal Child health clinic for the various activities offered at the Clinic, six short of the ideal. The clinic receives about 40 antenatal and 60 post natal women daily. No posters on PMTCT and retesting were seen on the walls of the clinic. The posters on the walls were those concerning Child Health programmes.

None of the 292 mothers that were retested seroconverted. The study was not powered to detect seroconversion. Also of note is the low prevalence of HIV (12%) in antenatal mothers at Chilenje clinic. This is much lower than that found at other clinics where the prevalence of HIV in pregnant women ranges between 16 to 21%.

Nearly all (99%) of the women offered repeat testing during the study accepted the test. This shows that refusal of repeat testing does not contribute to its low levels. Once the test is offered, the probability that a woman will refuse the test is almost nil.

CHAPTER SIX

6.1 CONCLUSION

Women that are aware of repeat antenatal HIV testing are four times more likely to receive a repeat test than those that are not. Booking in the first trimester increases the chance of being retested two fold. Women that have 5 or more ANC visits have a three-fold chance of being retested than those with fewer visits.

6.2 LIMITATIONS

The results obtained from this study may not be generalizable to all clinics in Lusaka as there may be factors that are specific to Chilenje Clinic. For example, the study found that 29% of the study population attended tertiary education, 82% were married, 80% lived in 'middle class' housing and 95% delivered in a health centre. This is certainly not representative of the population in Lusaka.

Recall bias was the second limitation since mothers were asked about an event that had occurred in the past.

Several factors can influence maternal awareness of repeat antenatal HIV testing. Both Maternal and Health facility based factors should have been explored. The study explored mostly maternal factors, and the data presented is mostly quantitative.

The omission of collecting data on health facility related issues e.g listening in to a counseling session by a PMTCT qualified counselor, interviews with health centre staff and the omission of qualitative data from the mothers e.g focus group discussions missed out on a richer data set that would have produced a more robust recommendations for policy and practice.

6.3 RECOMMENDATIONS

Counseling in the antenatal period must be strengthened to ensure that women are empowered to be able to ask for a repeat test when not offered. Campaigns that encourage early booking and a minimum of four ANC visits as recommended by MOH should be intensified and implemented in all health facilities.

PMTCT guidelines which emphasize repeat testing should be adhered to in all antenatal clinics to ensure full benefit of the programme whose aim among others is to reduce HIV infection in children.

The Ministry of Health should critically and periodically look at the staffing levels in the local clinics to ensure that the staff are not overwhelmed and stretched to the point that they compromise service delivery to the community, otherwise a reversal of the gains in PMTCT will be seen.

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42. UNICEF Statistics for Zambia 2003 -2008

43. Chilenje Clinic Records and Interview with Chilenje Clinic Sister-in-Charge

APPENDIX A

QUESTIONNAIRE

SERIAL NUMBER ☐ ☐ ☐

A. SOCIO-DEMOGRAPHICS

1. Residence_____

2. Religion (if Christian please specify)_____

3. Age in years(last birthday)_____

4. Marital Status

0. Single ☐
1. Married ☐
2. Divorced ☐
3. Separated ☐
4. Widowed ☐

5. Highest level of education completed

0. No education ☐
1. Primary education ☐
2. Secondary education ☐
3. Tertiary education ☐

6. Occupation

0. Formally employed (specify)_____
1. Self employed (specify)_____
2. Unemployed

7. Economic status (monthly income)

0. <K1,000,000

1. K1,000,000 – K2,000,000

2. >K2,000,000

8. Child's birthday and feeding

Birthday(dd/mm/yr)____/_____/____ Sex ☐ 0. M ☐ 1. F

Age in weeks _____

0. Breastfeeding
1. Formula
2. Animal milk
3. Mixed

B. ANTENATAL

1) Gestational age at booking

0. First trimester (from conception till 12 weeks), specify_____

1. Second trimester (from 13 weeks till 27 weeks), specify_____

2. Third trimester (from 28 weeks till 42 weeks), specify_____

2) Number of times pregnant_____

3) Number of routine antenatal visits attended in last pregnancy_____

4) RPR Done 0. Yes ☐ 1. No ☐

Result_____

5) **Provision of other antenatal medication**

0. Antimalarial
1. Hematinics
2. Deworming
3. Tetanus toxoid

6) Mode of transportation to ANC

0. Car
1. bus
2. Walking
3. Cycle

---

7) **Place delivered**

0. Home
1. Clinic_____
2. Hospital_____

C. HIV TESTING

1) Date of 1st HIV test_____

2) Assessment of awareness of repeat HIV test in later pregnancy

In the antenatal counseling you underwent prior to being tested for HIV, were you told that you needed to retest for HIV later in pregnancy?

0. Yes 1. No

3) Repeat HIV test done ☐ 0. YES ☐ 1. NO

(Includes test done in labor ward)

If yes, date of repeat test_____

If no, state reasons (circle all that apply)

0. Didn't feel like coming back for a retest
1. Afraid that initial test was negative only by chance, and the retest might be positive
2. There was no way I could have become positive after a negative test
3. No transport money to go back to clinic
4. I forgot
5. No reason
6. No one told me I needed to retest
7. When I went for a retest, I was told it was too early to repeat the test
8. When I went for a retest, there was no counselor to carry out the test
9. When I went for a retest, all the counselors were too busy
10. When I went for a retest, I was told there were no test kits
11. The queues were too long
12. I didn't like the way I was treated at the clinic
13. Other, please specify_____

D. ASSESSMENT OF ACCEPTABILITY OF REPEAT HIV TESTING

Would you mind if we carried out a repeat HIV test on you? 0.Yes ☐ 1. No ☐

If yes, result of repeat test ☐ 0. Negative ☐ 1. Positive ☐ 2. Indeterminate

If result positive, HIV test on infant: ☐ 1. ACCEPTED ☐ 2. DECLINED

Result of infant _____

APPENDIX B

The University of Zambia

Directorate of Research and Graduate Studies

INFORMATION SHEET

Good morning Madam. My name is Dr. Agnes Mtaja. I am conducting a study entitled '**Effect of maternal awareness of repeat antenatal HIV testing on actual repeat testing at six weeks post partum at Chilenje Clinic, Lusaka'.** This is in partial fulfillment of the requirements for the Master of Medicine in Pediatrics and Child Health.

You are amongst the women chosen to participate in this study, if this will be okay with you.

WHAT THE STUDY IS ABOUT

This study is about assessing whether women are aware that they are to have a repeat HIV test later in pregnancy once the initial one is negative. It is also about the how this knowledge affects a woman being found HIV positive at six weeks after birth.

WHAT YOU WILL BE ASKED TO DO IN THE STUDY (PROCEDURE)

Once you consent to be in the study, you will be asked a few questions about your last pregnancy, the antenatal visits, the tests and results of the tests carried out, your knowledge on repeat HIV testing in later pregnancy. You will then be counseled and retested for HIV if you did not have a repeat test in pregnancy. Your baby will also be tested for HIV if your HIV test is positive. Only a few drops of blood (about 3 drops maximum) will be required. All these tests will be done by experienced counselors.

RISKS, INCONVINIENCES AND DISCOMFORTS

Inconveniences include answering questions, typically about 10 minutes. You will be required to answer the questions as the counselors ask them. You may experience some emotional/psychological stress in anticipation of new HIV test result or in the event that your result becomes positive. Also, you may experience some very slight discomfort from the needle prick. To minimize this risk, you will be asked to sit while you are being counseled and while your blood is being collected by our experienced counselors. After your result is given to you, you will be counseled again.

If you experience any form of stress from answering the questionnaire, or from the pin prick, you will be able to stop the process at any time. You could choose to continue, to not continue, or to withdraw from the study completely at no penalty to you.

BENEFITS OF THE RESEARCH AND BENEFITS TO YOU

Your participation in the study will be highly beneficial as it will enable us to see the number of mothers becoming HIV positive after a negative antenatal test. We will also be able to deduce how informed pregnant women are about retesting later in pregnancy and be able to intervene appropriately. It will also be of benefit to you as you will receive additional information about keeping yourself HIV negative if your result remains negative. If your result is positive, it will benefit you as you and your baby will be referred for follow up and appropriate care. If your baby is negative while you are positive, you will learn how you can keep the baby from getting infected.

VOLUNTARY PARTICIPATION

Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with Chilenje Clinic now or in the future.

ALTERNATIVES TO PARTICIPATION

If you choose not to participate in this study, you may continue the medical care that you are currently receiving.

COSTS TO YOU

There will be no costs to you that are directly related to this study.

PAYMENT FOR PARTICIPATION

You will not be paid for your participation in this research

CONFIDENTIALITY

Your research records will be confidential to the extent permitted by law. You will be identified by a code, and personal information from your records will not be released without your written permission. You will not be personally identified in any publication about this study. A research assistant will keep all records in secure data base.

QUESTIONS ABOUT THE RESEARCH

If you have questions about the research in General or about your role in the study, PLEASE FEEL FREE TO CONTACT Dr. AGNES MTAJA ON CELL NUMBER 097-7-784609 OR EMAIL msanida1@yahoo.co.uk. You may also contact THE CHAIRPERSON, BIOMEDICAL RESEARCH ETHICS COMMITTEE AT TELEPHONE 256067, EMAIL unzarec@unza.zm

CONSENT FORM

AWARENESS OF REPEAT ANTENATAL HIV TESTING IN MOTHERS SIX WEEKS POSTNATAL AT CHILENJE CLINIC, LUSAKA.

LEGAL RIGHTS AND SIGNATURES

I_____consent to participate in the above named study conducted by Dr. A Mtaja. I have understood the nature of the project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature/thumprint below indicates my consent.

_____	_____	_____
Signature/thumprint of Participant	Name of Participant	Date
_____	_____	_____
Signature of Witness	Name of Witness	Date
_____	_____	_____
Signature of Investigator	Name of Investigator	Date
_____	_____	_____
Signature of Person obtaining consent (If other than investigator)	Name of Person obtaining consent (If other than investigator)	Date

Participant's Initials