Implementation of Prevention of Mother-to-Child Transmission of HIV and Maternal Syphilis Screening and Treatment Programmes in Mwanza Region, Tanzania:

Uptake and challenges

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STATEMENT OF OWN WORK

I hereby declare that this thesis is my own work. Under the guidance of my supervisor, Dr Deborah Watson-Jones and the advisory committee (Professors David Mabey and David Ross and Dr Helen Weiss), I wrote the proposal and designed the data collection tools used in this research. I trained the research assistants who participated in the data collection and supervised all aspects of data collection. I participated in the data collection: interviewing health workers, interviewing women, recruiting and following up HIV-positive women in the cohort study. I carried out the observational study at the ANC facilities.

I prepared the data entry screens, supervised the data entry process and I carried out the data cleaning. I did the data statistical analysis with some advice from Dr Helen Weiss, I wrote and edited this thesis.

DECLARATION

I have read and understood the School's definition of plagiarism and cheating given in the Research Degree Handbook. I declare that this thesis is my own work, and that I have acknowledged all results and quotations from the published or unpublished work of other people.

Signed  **Date** 13/08/2010

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In the memory of my loving parents

The late

Reverend Hezekiel Balira and Mrs. Penina Balira

Also

To my precious and highly treasured gifts from God

Daughter Lisa

and

Sons

Ezekiel, Ryan and Derick

ABSTRACT

Literature and other background information on prevention of mother-to-child transmission of HIV (PMTCT) and maternal syphilis screening programmes in Tanzania reveal that little has been documented on accessibility and utilization of these services. This thesis presents the results from a research conducted in Mwanza city, Tanzania to assess the operational performance of PMTCT and maternal syphilis screening and treatment during pregnancy, at delivery and in the postnatal period.

From different sub-studies conducted at the antenatal clinics (ANC) and in the maternity ward for this research, a number of missed implementation opportunities were identified. A review of records found that 24% of pregnant women who delivered in hospital left the maternity ward with unknown HIV status and 50% of HIV-positive women tested at ANC did not receive Antiretroviral therapy (ART) for PMTCT.

A cross-sectional study at the maternity ward found that 12% of pregnant women who were not screened for syphilis, 27% of RPR-positive women who were not treated at ANC, and all infants of RPR-positive women did not receive any intervention to prevent congenital syphilis.

Forty-one percent of HIV-positive women recruited in the cohort study successfully completed all PMTCT interventions. Only 18% of HIV-positive women identified through PMTCT were successfully referred to, and attended an adult care and treatment clinic (CTC). Of 403 HIV-positive women in the cohort study, 50% did not intend to get pregnant and by four months postpartum, 20% of them reported to have not received any counselling on family planning. HIV-positive women who did not receive counselling on FP use were at a higher risk of not using contraception compared to those who were counselled (adj. OR=6, 95% CI; 2.8-12.9). About 27% of HIV-positive mothers were not counselled regarding infant feeding and 40.2% of women who were not counselled on infant feeding were undecided on how to feed their infants before they left the hospital compared to only 2.5% of women who were counselled ($p<0.001$)

It was found that pregnant women attending ANC for the first time during pregnancy spent between three and 5.5 hours at the clinic, on average, 78% of this time was spent waiting for services.

Fewer ANC visits, attending private or rural ANC facilities, failure to attend a CTC prenatally, and lack of knowledge among users and provider of health services were factors found to hamper the performance of the programmes.

Integration of these programmes at all levels and training of health workers in basic components of the programmes are fundamental to the successful implementation of the programmes.

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3TC	Lamivudine
AIDS	Acquired Immunodeficiency Syndrome
AMO	Assistant medical officer
ANC	Antenatal care
ARV	Antiretroviral
ART	Antiretroviral therapy
AZT	Azidothymidine
BD	Twice daily
BMC	Bugando Medical Centre
BV	Bacterial vaginosis
CDC	Centre of Disease Control
CI	Confidence interval
CPT	Cotrimoxazole preventive therapy
CS	Congenital syphilis
CTC	Care and treatment centre
DALY	Disability adjusted lost years
DBS	Dried blood spots
DNA	Deoxyribonucleic acid
EBF	Exclusive breastfeeding
FGD	Focus group discussion
FP	Family planning
HAART	Highly Active Antiretroviral Therapy
HC	Health Centre
HEI	HIV-Exposed Infant
HIV	Human Immunodeficiency Virus
HSV-2	Herpes Simplex Virus type 2
KCMC	Kilimanjaro Christian Medical Centre
L&D	Labour and Delivery
LSHTM	London School of Hygiene and Tropical Medicine
LTFU	Lost to follow up
MCH	Maternal and Child Health
MD	Medical doctor

MF	Mixed feeding
MNH	Muhimbili National Hospital
MRCC	Medical Research Coordinating Committee
MTCT	Mother-to-Child Transmission
MU	Million units
NDH	Nyamagana District Hospital
NIMR	National Institute for Medical Research
NVP	Nevirapine
OR	Odds ratio
PACTG	Paediatric AIDS Clinical Trials Group
PCR	Polymerase chain reaction
PICT	Provider initiated counselling and testing
PMTCT	Prevention of Mother-to-child Transmission
POC	Point of care
RCH	Reproductive and Child Health
RPR	Rapid plasma reagin
sdNVP	Single dose nevirapine
STD	Sexually transmitted diseases
STRH	Sekou-Toure Regional Hospital
TPHA	Treponemal pallidum haemagglutination assay
TPPA	Treponemal pallidum particle Agglutination
TT	Tetanus toxoid
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
VCT	Voluntary counselling and testing
VDRL	Venereal Disease Research Laboratory
WHO	Wold Health Organisation

CHAPTER 1: INTRODUCTION

1.1 Background

In Africa more than 70% of pregnant women attend the antenatal care (ANC) services at least once during pregnancy [1]. Antenatal care (ANC) clinics are known as an excellent entry point for reaching pregnant women with various health interventions particularly prevention of mother-to-child transmission (PMTCT) of human immunodeficiency virus (HIV) and maternal syphilis screening and treatment.

While PMTCT has become a priority in many developing countries and research has reported a decrease in proportion of HIV-exposed infants (HEI) who acquire HIV through mother- to-child transmission (MTCT) of HIV [2], in Tanzania it is not known how many HIV-positive women who have access to these services, successful complete the program. In addition, it is not clear what the factors are that influence the failure to complete the program. In reality a high proportion of HIV-positive pregnant women who attend the ANC during pregnancy are being identified through PMTCT, but many get lost along the way before the completion of PMTCT interventions.

Previously, HIV testing in ANC during pregnancy mainly focused on preventing the infection from HIV-positive mothers to their infants with less focus on keeping the mothers healthy. However, recently WHO following the global effort to combat HIV in children called for best evidence–based interventions to reduce the risk of transmission from HIV-positive mothers to their infants as well as promoting the health of the mothers [3]. Health benefits as a result of initiating HAART during pregnancy, such as stronger immune system and decreased risk of HIV-related morbidity for the mothers and lower risk of acquiring HIV for their infants, have been documented [4]. However, studies in other parts of Africa estimated that only 40% of HIV-positive pregnant women in need of HAART receive it [5]. In Tanzania, it is not known how many HIV-positive pregnant women identified through PMTCT HIV screening get referral to a care and treatment clinic (CTC) and attend a CTC during pregnancy or during the postnatal period. In addition, it is not known how many women are assessed at a CTC for the eligibility to initiate on HAART and how many initiate HAART before or after delivery.

Research has reported an increasing number of babies with congenital syphilis (CS) despite getting PMTCT [6-7]. This indicates a failure in the basic system of sexually transmitted diseases (STD) control and prenatal care and raises concerns that other ANC health

interventions are being given less or no attention as a result of the focus on PMTCT intervention. The reality is that in developing countries, infants who receive antiretroviral prophylaxis and successfully complete PMTCT programme may still die from CS due to lack of syphilis screening interventions during ANC [7]. This scenario and the opposite of it may as well apply in Tanzania where syphilis screening is frequently not being implemented in clinics that offer PMTCT services or where PMTCT services are not offered in ANC facilities that offer syphilis screening and treatment during pregnancy.

The epidemiology and transmission of HIV and syphilis are closely correlated. Screening for both HIV and syphilis during pregnancy is possible and would lead to better maternal health and pregnancy outcomes. In addition, when compared to PMTCT, prevention of congenital syphilis (CS) has been reported to be inexpensive, simple and highly cost effective [8-9] .

Innovative ways are therefore needed to address these potentially preventable and treatable maternal conditions in resource-limited countries. Understanding the reality and key barriers to successful implementation of these two key maternal programmes, PMTCT and maternal syphilis screening and treatment is needed in order to provide recommendation that may help strengthen the integration of PMTCT and maternal syphilis screening and treatment services.

1.2 Outline of the work to be presented

This thesis consists of twelve chapters. A brief introduction of the subject is given in Chapter 1. Published literature relating to MTCT and PMTCT of HIV and maternal syphilis screening and treatment are reviewed in Chapter 2. The study conceptual framework, objectives and rationale are documented in Chapter 3. Six sub-studies were conducted to address the objectives of the research; the descriptions of the methodology for these sub-studies are presented in chapter 4. Chapters 5, 6, 7, 8, 9 and 10 review the studies in details and discuss the results. Chapter 11 presents the overall discussion of the key findings and the conclusion and recommendations are presented in chapter 12.

CHAPTER 2: LITERATURE REVIEW

The review of global literature on mother-to-child transmission (MTCT) and prevention of mother-to-child (PMTCT) of both HIV and syphilis is presented in this chapter. The literature review was done on the work conducted worldwide but mainly focused on studies conducted in Africa and specifically sub-Saharan Africa and, where available, studies conducted in Tanzania were reviewed.

2.1 HIV/AIDS global overview

The HIV pandemic is one of the most serious health problems the world faces today. The Joint United Nations Programme on HIV/AIDS (UNAIDS) and the World Health Organisation (WHO) estimates that over 6,800 persons become infected with HIV and over 5,700 person die from Acquired Immunodeficiency Syndrome (AIDS) every day [10]. An estimated 33.4 million people are living with HIV, 2.7 million people have been infected with HIV and 2.0 million deaths due to AIDS occurred globally in 2008 alone. Women account for 50.2% of all adults living with HIV globally. The number of children living with HIV increased from 1.5 million in 2001 to 2.1 million globally in 2008. However, estimated new infections among children declined from 460,000 in 2001 to 430,000 in 2008 [11].

Sub-Saharan Africa continues to be the region most affected by HIV. More than 68% of HIV-positive adults are living in sub-Saharan Africa. Sixty-eight percent of all new infections and 76% of all death due to AIDS in 2007 occurred in sub-Saharan Africa. An unequal burden has been placed on women and children, who, in many settings, continue to experience high rates of new HIV infections and HIV related illness and death. Women account for 61% of all adults living with HIV in sub-Saharan Africa and almost 90% of all HIV infected children are currently living in sub-Saharan Africa [10].

AIDS is a leading cause of death among adults in Tanzania. It was estimated that 160,000 adults and children died of HIV/AIDS in 2006 [12]. In Tanzania, which has a population of 34.5 million, WHO estimates an HIV prevalence of 7% in the general population [10, 12]. The main modes of HIV transmission in Tanzania are heterosexual and MTCT.

2.2 *Mother-to-child transmission of HIV*

MTCT of HIV occurs when an HIV-positive woman passes the virus to her baby. MTCT of HIV accounts for 90% of all HIV infections in children [13]. MTCT of HIV can occur during pregnancy, especially in the last trimester, during labour and delivery, and post-natal, during breastfeeding [14].

In the absence of treatment, around 15-30% of babies born to HIV-positive women will become infected with HIV during pregnancy and delivery and a further 5-20% will become infected through breastfeeding [14].

Another previous study estimated that 30% of the infants get infected vertically and that the relative frequency of timing of transmission is as follows: 2% early in gestation, 3% late in gestation, 15% during labour and delivery, 5% in the early postpartum period and 5% in the late postpartum period [15].

At the end of 2008, 2.1 million children were living with HIV globally. In 2008 alone, an estimated 430,000 children became infected with HIV, mainly through MTCT and of the two million people who died of AIDS in 2008, more than 10% were children [11]. HIV-exposed infants (HEI) face two significant challenges in their early life; if they escape the risk of MTCT of HIV during the perinatal and breast-feeding periods, they remain at high risk of becoming orphans by losing one or both parents to the HIV disease.

AIDS is an important cause of mortality and morbidity in infants after the first month of life in many African countries. A study conducted using data collected from seven sub-Saharan countries to assess mortality rates in children of HIV-positive mothers found that when compared to HIV-uninfected children, HIV infected children were at a higher risk of death from HIV-related complications. Overall, in the absence of ARV to the infants, 30% of newborns infected with HIV die before the age of one year, more than 50% die before reaching their second birthday and most are dead before they are five years old [16].

In high income countries MTCT has been virtually eliminated as a result of effective voluntary testing and counselling (VCT), availability and access to antiretroviral therapy (ART), safe delivery practices and availability and affordability of safe infant feeding replacement [13, 17]

2.2.1 Risk factors for mother-to-child transmission of HIV

Potential risk factors for MTCT of HIV can be divided into three categories, namely, maternal, obstetric and paediatric factors [18].

2.2.1.1 *Maternal risk factors*

Studies documented AIDS disease (the stage of illness where AIDS defining illnesses are present) and maternal viral load as the strongest independent predictor of MTCT of HIV [19-20]. An unborn child can get infected in utero through maternal blood, transplacental haemorrhage and infection via the umbilical cord or via the gastrointestinal mucosa while swallowing infected amniotic fluid [15]. Untreated reproductive tract infections, especially bacterial vaginosis (BV), were also documented to have an association with MTCT of HIV. The findings by Taha and colleagues reported that BV may be associated with an increased risk MTCT of HIV as well as maternal HIV infection in pregnancy and premature delivery [21].

2.2.1.2 *Obstetric risk factors*

Obstetric factors that increase the risk of MTCT of HIV include longer duration of ruptured membranes [22]. Contact with the mother's blood and/or secretions during labour and delivery also increased the risk of HIV transmission to the infant [15]. Vaginal delivery was also documented as a risk factor for MTCT of HIV, which may occur via direct contact of the infant with the virus present in the genital tract during delivery. The risk associated with vaginal delivery is higher for pregnant women with high viral load and low CD4 counts who are not on ART during delivery [23].

2.2.1.3 *Paediatric risk factors*

Paediatric risk factors for MTCT of HIV include premature delivery, breastfeeding and breast health [18]. Premature infants of HIV-positive mothers were reported to be more likely infected than full-term infants and the risk was more significant with prolonged duration of ruptured membranes [24].

Studies have proved that HIV is present in breast milk, although the viral concentrations in breast milk are significantly lower than those found in blood [25]. High maternal viral load measured during pregnancy or after delivery and low maternal CD4 count are reported to be associated with increased rate of MTCT of HIV through breast milk [26]. The risk of MTCT of HIV through breastfeeding is greatest in early infancy and carries on as long as breastfeeding continues [27]; the efficiency of transmission through breast milk ranges between 16%-29%

[15]. Breastfeeding for a long duration was associated with increased risk of MTCT of HIV [28-30]. Findings from a randomised clinical trial of breastfeeding versus formula feeding in infants of HIV-1 infected mothers in Nairobi, Kenya, suggested that the volume of milk ingested is also an important factor in breast milk transmission of HIV [31]. An individual patient meta-analysis from Tanzania, Kenya, Uganda, South Africa, Burkina Faso and Cote d'Ivoire estimated that 42% of the cases of HIV infection in children were attributable to breastfeeding [32].

Other factors that increase the risk of transmitting HIV during breastfeeding include mastitis, cracked or bleeding nipples, breast abscesses, candidal infection of the breast, and oral ulcers or sores in the infants' mouth, which usually occur with recent HIV infection or an advanced HIV disease (AIDS) [32-34]. A study conducted in South Africa to assess the HIV-1 transmission risks and survival associated with exclusive breastfeeding and other types of infant feeding found that babies who were exclusively breastfed had a lower risk of becoming infected with HIV compared to those who had mixed feeding [35].

2.2.2 Core interventions for PMTCT of HIV

Core PMTCT interventions are those which directly prevent MTCT of HIV during pregnancy, labour and delivery as well as during the postpartum period for women who are already HIV-infected. These includes: comprehensive Reproductive and Child Health (RCH) services (antenatal; postnatal and child health); HIV voluntary counselling and testing; antiretroviral therapy; optimal obstetric care; caesarean delivery; and safer infant feeding practices [18].

2.2.2.1 *Comprehensive RCH services (antenatal, postnatal and child health)*

For pregnant women to access any or all core interventions for PMTCT, they must be identified as being HIV-infected and have access to health services during antenatal period. A full antenatal service package needs to include: provider-initiated HIV counselling and testing; maternal tetanus toxoid immunization; sexually transmitted diseases (STD) screening and treatment (at least for syphilis); iron and folate supplementation, malaria preventive intermittent treatment; basic obstetric care; and information on HIV prevention, infant feeding and family planning [36]. The comprehensive strategy approach aims to respond to the wide range of health needs of women and their children including family. It is an excellent entry point for delivering HIV/AIDS education and prevention to pregnant women who should be encouraged to use existing services more frequently and earlier in pregnancy.

2.2.2.2 *Provider initiated HIV testing and counselling (PITC)*

Provider initiated testing and counselling (PITC) refers to HIV testing and counselling which is recommended by health care providers to persons attending health care facilities as a standard component of medical care [37]. The key purpose of such testing is to enable specific medical services to be offered that will not be possible without knowledge of the person's HIV status and to give an opportunity to offer risk reduction counselling.

PITC services are necessary for PMTCT in order to identify women who may benefit from PMTCT interventions. In the absence of PITC services, most women have no definitive way to know their HIV status. As a result, they have no access to PMTCT interventions. For example, in Tanzania, according to the national PMTCT guidelines, ARV prophylaxis for PMTCT is only given to women with confirmed HIV infection [37]. Also counselling on infant feeding is the most effective measure when it can take into account the actual mother's HIV status. Therefore, a routine provider initiated offer of HIV testing and counselling for all pregnant women, preferably as early in pregnancy as possible, should be considered an integral component of essential care to women during pregnancy.

Research in developing countries have shown that voluntary counselling and testing (VCT) is a cost effective intervention for reducing HIV-related risk behaviour, particularly when it targets couples at high risk [2, 38]. Experience from Thailand in early years of the epidemic confirmed the value of VCT in contributing to reduction of HIV transmission [39]. In areas highly affected with HIV, PITC or VCT is increasingly being viewed as an integral part of access to comprehensive, essential, quality health care.

For pregnant women who fail to access the PMTCT services in the antenatal period, PITC for women in labour or shortly after child birth can also facilitate their entry into PMTCT services as well as other HIV prevention, treatment and care services [37].

2.2.2.3 *Antiretroviral therapy (ART)*

Antiretroviral therapies are drugs that inhibit the ability of HIV to multiply in the body. ART decreases HIV viral load in the infected mother, which reduces an infant's exposure to HIV. ART given to the mother during pregnancy or to the infant soon after delivery also provides prophylaxis or protection for the infant during and after exposure to HIV. While ART drugs do

not cure HIV or eliminate the virus from the body, they are effective for both treating HIV infection in the pregnant woman and reducing MTCT of HIV.

Providing HIV treatment, care and support is vital for enabling HIV-infected women to address their health needs. According to the WHO guidelines, all pregnant women eligible for highly active antiretroviral therapy (HAART) must be started on treatment, and pregnant women who do not yet need HAART must be given a highly effective ART as HIV prophylaxis for MTCT [40].

Various ARV drugs, either alone or in combination with two or more drugs, reduce the risk of MTCT of HIV [41-46]. The first major breakthrough in the prevention of MTCT of HIV came in 1994, with the three part Paediatric AIDS Clinical Trials Group (PATG) 076 trial, which confirmed that long course Azidothymidine (AZT) prophylaxis given early in pregnancy and intravenously during delivery to the mother and for six weeks to the infant orally, significantly reduces the risk of MTCT from 25% to 8% [42]. The regime was quickly introduced in Europe and North America, but it seemed costly and complex for resource poor countries.

The simplest of all PMTCT drug regimens was tested in the HIVNET 012 trial, which took place in Uganda between 1997 and 1999. This study found that a single dose of Nevirapine (sdNVP) 200mg orally given to the mother at the onset of labour and a 2mg/kg body weight dose given to the baby within 72 hours of delivery roughly halved the rate of HIV transmission [42, 46]. As it is given once to the mother and the baby, sdNVP was recommended as one of the few deliverable and suitable strategies for the prevention of peri-natal HIV-1 in resource poor countries [46].

Other short course ARV prophylaxis includes AZT alone, AZT with Lamivudine (3TC), and combinations of AZT and sdNVP or AZT, Lamivudine (3TC) and sdNVP [43]. Other studies documented that combined and longer regimes starting earlier in pregnancy are more efficacious than single drug and/or shorter regimes [47-48]. Therefore, in order to increase the effectiveness of PMTCT programmes, many countries with a heavy burden of HIV, have adopted more effective ARV regimes, beginning in the third trimester of pregnancy, which can reduce the risk of transmission during pregnancy and childbirth to 2-4% [49-50].

Recently, following the confirmation that ARV prophylaxis for mothers or their infants could significantly reduce the risk of postnatal HIV transmission [51-53], WHO developed new treatment guidelines for pregnant women who do not need HAART for their own health and for their infants. The new treatment guidelines provide two options. First, for the mother, AZT twice a day should be started at 14 weeks gestation or any time thereafter during pregnancy. At onset of labour and delivery, the mother should be given sdNVP plus AZT and 3TC twice daily until delivery. AZT and 3TC should be continued for 7 days postpartum. For the breastfeeding infants, daily NVP prophylaxis should be given from birth until 1 week after the end of the breastfeeding. For HEI receiving replacement-feeding sdNVP at birth is recommended plus twice-daily AZT from birth until 4 to 6 weeks after birth.

The second option is a three drug regimen for the mother, taken during pregnancy, starting at 14 weeks gestation until delivery and if breastfeeding, throughout the breastfeeding period while their infants use the prophylaxis for six weeks after birth [3].

Table 2-1 **ARV prophylaxis options recommended for HIV-infected pregnant women who do not need treatment for their own health [3]**

	Option A	Option B
Mother	Ante partum twice-daily AZT starting from as early as 14 weeks of gestation and continued during pregnancy. At onset of labour, sd-NVP and initiation of twice daily AZT + 3TC for 7 days postpartum. (Note: If maternal AZT was provided for more than 4 weeks antenatally, omission of the sd-NVP and AZT + 3TC tail can be considered; in this case, continue maternal AZT during labour and stop at delivery).	Triple ARV prophylaxis starting from as early as 14 weeks of gestation and continued until delivery, or, if breastfeeding, continued until 1 week after all infant exposure to breast milk has ended. Recommended regimens include: AZT + 3TC + LPV/r or AZT + 3TC + ABC or AZT + 3TC + EFV or TDF + 3TC (or FTC) + EFV
Breastfeeding infants	Daily NVP from birth for a minimum of 4 to 6 weeks, and until 1 week after all exposure to breast milk has ended.	Daily NVP or twice daily AZT from birth until 4 to 6 weeks of age
Infants receiving replacement feeding only	Daily NVP or sd-NVP + twice-daily AZT from birth until 4 to 6 weeks of age.	Daily NVP or twice daily AZT from birth until 4 to 6 weeks of age.

2.2.2.4 *Optimal obstetric practises during labour and delivery.*

MTCT of HIV during the intrapartum period is believed to be due to the infant exposure to infected blood and other fluids from the mother. Thus, great care during delivery is needed to avoid practices that may facilitate this exposure, such as artificial rupture of membranes and episiotomy in cases where there is no obstetric indication. These safer practices should be a routine part of the management of labour for all women in high HIV sero-prevalence areas [54].

A caesarean section is an operation to deliver a baby through its mother's abdominal wall. For HIV-positive mothers, the caesarean section may be done to protect the baby from direct contact with the mother's blood and other body fluids. Studies conducted in developed countries demonstrated a strong association between mode of delivery and the risk of MTCT of HIV [55]. HIV infected women who delivered by caesarean section performed before labour and ruptured membranes had significantly decreased risk of transmission compared with women who delivered by other modes [56-57]. Such intervention is recommended for mothers not taking any antiretroviral drugs [57]. However, the caesarean section was also reported to have an increased risk of illness after delivery among HIV-positive and HIV negative women [58], and therefore, there is a need to weigh the risk of HIV transmission against the risk of harm due to the intervention. In many resource poor settings, the procedure is rarely recommended.

2.2.2.5 *Counselling for safer infant feeding practices*

The problem of MTCT of HIV through breastfeeding has made safe infant feeding one of the most difficult and distressing aspects of PMTCT. Breastfeeding for a long time has been advocated as one of the most important child survival and early childhood development interventions [59] and it has many health, nutritional, birth spacing, emotional and psychosocial benefits.

Research has shown that the protective benefits of antiretroviral drugs are reduced when babies continue to be exposed to HIV through breastfeeding. A randomised controlled trial whereby mother-infant pairs were randomized to breastfeeding against formula feeding arms in order to determine the frequency of HIV transmission through breastfeeding and comparison mortality rates among breastfed and formula fed infants of antiretroviral naïve mothers in Kenya found that the frequency of breast milk transmission of HIV-1 was 16.2%,

and that the majority of infections occurred early during breastfeeding. The same study found out that the use of breast milk substitutes prevented 44% of infant infections and was associated with significantly improved HIV-1-free survival [60].

However, a study among infants of mothers who received AZT 300mg orally twice a day from 34 weeks gestation and during labour in Botswana documented no improved HIV free survival with breast milk substitutes. The Mashi study that compared the efficacy and safety of two infant feeding strategies for prevention of postnatal MTCT found that breastfeeding combined with maternal AZT prophylaxis was not as effective as formula feeding in preventing postnatal HIV transmission, but was associated with a lower infant mortality rate at 7 months. Both strategies were reported to have comparable HIV-free survival at 18 months [61]. Therefore, the effects of breastfeeding to children born to HIV-positive mothers regarding the infant morbidity or mortality are still contradictory.

Complete avoidance of breastfeeding is often not feasible in resource poor settings due to several reasons including the cost of formula or replacement feeding, stigma associated with not-breastfeeding, and the potential morbidity as well as and mortality associated with replacement feeding [30]. In situations where breastfeeding is the chosen method of infant feeding, exclusive breastfeeding (EBF) is the best option since EBF is associated with a lower risk of MTCT of HIV than mixed feeding [62-63].

Despite the inconclusive evidence on the benefits of formula feeding in women taking ART, HIV-positive mothers are advised not to breastfeed whenever the use of breast milk substitutes is acceptable, feasible, affordable, sustainable and safe [37, 64]. In poor developing countries where safe water is often not available, then the risk of life-threatening conditions from formula feeding may be higher than the risk from breastfeeding [65]. The WHO infant feeding guidance also states that HIV-positive mothers should receive counselling including general information about the risks and benefits of various infant feeding options and specific guidance in selecting the option most likely to suite their circumstances [66]. They should also have access to follow-up, care and support, including family planning and nutritional support and the mothers' choice should always be respected.

2.2.2.6 *Family planning counselling and services*

The broader approach to prevent MTCT of HIV defined by the United Nations includes preventing unintended pregnancies to HIV-positive women and recommends the linkage of family planning (FP) and PMTCT [67].

Several studies have demonstrated the important role of family planning in PMTCT of HIV. A study conducted in eight African countries found that a moderate decrease in the number of pregnancies to HIV-positive women resulted in an equivalent number of HIV-positive births averted as the current PMTCT effort of using sdNVP for HIV-positive women and their newborns [68]. Another study that examined the benefits of adding family planning to PMTCT programs in fourteen countries found that in addition to the other positive benefits, family planning added onto PMTCT services averted 71,000 child HIV infections compared with the 39,000 HIV-positive births averted with PMTCT only [69]. Furthermore, Reynolds and colleagues estimated that current levels of contraceptives use in sub-Saharan Africa are already preventing 22% of HIV-positive births [70], and that increasing contraceptive use among women who do not want to become pregnant and who may not necessarily know their HIV status is at least as cost effective as reducing HIV transmission by sdNVP for PMTCT [71].

Many countries still experience high levels of unintended childbearing particularly countries with high HIV prevalence [72]. Women who find out that they are HIV-positive may perhaps have a strong desire to avoid bearing children who might be born HIV-positive and/or may become orphaned at an early age. Furthermore, HIV-positive mothers who opt not to breastfeed miss the birth spacing effect of lactational amenorrhea and have their own special needs for contraception to space or limit future births. Women's understanding of the fact that the risk of MTCT increases as the mother's own infection progresses and that the risk of MTCT of HIV may increase with following pregnancies is important.

Therefore, HIV-positive births could be prevented by preventing HIV infection among women of reproductive age and by preventing unintended pregnancies in HIV-positive women. Correct and consistent use of condoms has long been promoted to protect against STD including HIV among sero-discordant couples [2]. Condoms are the only contraceptive method that protect against acquisition of HIV and other STDs. Therefore, family planning services

should strongly encourage and facilitate HIV-positive women to use condoms consistently and correctly.

PMTCT services provide an excellent opportunity to offer family planning counselling and referral while informing HIV-positive women and couples about MTCT of HIV risks inherent in current and future pregnancies.

2.3 *Challenges to the implementation of PMTCT programmes*

Progress in implementing PMTCT in resource limited countries has been slow, with overall PMTCT coverage in low and middle income countries at about 11% in 2005 [73]. PMTCT programmes have been shown to be feasible, acceptable and cost effective. Nevertheless, despite significant progress in developed countries, they have not been implemented widely in resource-constrained settings including Tanzania.

A functioning PMTCT program must provide counselling and testing services to pregnant women. Clinical trials have proved the effectiveness of PMTCT programs in preventing MTCT of HIV. However, results from the trial may be different to programmatic results in the real world. Even where PMTCT services are available, not all women receive the full benefit of the services. Reasons for pregnant women not accessing PMTCT interventions include:

1. Not being offered the service;
2. Lack of trained staff;
3. Lack of integration of PMTCT services into maternal and child health;
4. Lack of intensive education;
5. Refusing to take a test;
6. Unavailability of treatment;
7. Not returning for treatment or follow up visits;
8. Lack of adherence support;
9. Not adhering to self-administered ART.

Although some clinics offer counselling and testing to every pregnant woman, the reality is that not all women accept the services. Others are tested but fail to return to receive their results. Data from pilot PMTCT programmes supported by UNICEF, reported that among more than 500,000 women attending ANC clinics in eleven countries including: Botswana, Burundi, Cote d'Ivoire, Honduras, India, Kenya, Rwanda, Tanzania, Uganda, Zambia, and Zimbabwe, only 71% received counselling [74]. Of those who were counselled, only 70% took an HIV test

and among HIV-positive women, only 49% received ARV for PMTCT. Assuming equal HIV prevalence among tested and non-tested women, fewer than 1 in 4 HIV infected women who attended the clinic went on to receive the intervention that they needed [75]. Many other studies in developing countries have shown that such high dropout rates are common [76-79].

A review of the national programme data for 2004-2005 from low and middle-income countries, to track progress in PMTCT reported that less than 50% of pregnant women testing positive for HIV at PMTCT sites in 2005 actually received ARV for PMTCT. In addition, only 11% of infants in need of HIV treatment were actually treated, revealing the fact that even when pregnant women with HIV are identified and initiated into health care system, many are being lost along the way as well as their infants [73].

2.4 *Situation of PMTCT activities in Tanzania*

In Tanzania, the Ministry of Health in collaboration with UNICEF initiated a PMTCT programme in 2000. This commenced after two years of initial planning and needs assessment, which started in 1998. Facilities that were involved in study included Muhimbili National Hospital (MNH) in Dar es Salaam, Bugando Medical Centre (BMC) in Mwanza city, Mbeya Referral Hospital in Mbeya city, Kilimanjaro Christian Medical Centre (KCMC) in Moshi and Kagera Regional Hospital in Bukoba [80].

Coverage and performance of PMTCT programmes in Tanzania have been poor. The proportion of HIV-positive pregnant women receiving antiretroviral prophylaxis for PMTCT in 2005 in Tanzania were less than 10% [81].

A few studies conducted in Tanzania, mainly, in Dar es Salaam and Kilimanjaro Regions, on the acceptance of HIV testing for PMTCT uptake have found that low HIV risk perception, stigma, lack of male partner involvement, frequency of antenatal care visits, lack of knowledge about MTCT, and individual counsellor effects were often associated with women's reluctance to be tested for HIV [82-84]. Other reasons included procedural failures within the RCH clinics and difficulty accessing services before and after delivery [78]. Most of these studies were conducted either in settings that offered VCT through client initiated HIV counselling and testing rather than through routine provider initiated services and/or where clients were required to go back on a different day for the HIV results.

Knowledge about MTCT and quality of counselling was also found have an influence on PMTCT uptake among pregnant women attending antenatal care (ANC) services [82, 84]. However, knowledge about MTCT among the general population in Tanzania is low. During the Tanzania HIV indicator survey in 2003/2004, it was found that more than 60% of males and females knew that HIV could be transmitted from the mother to the child. However, less than 20% knew about the preventive effect of ARV therapy on MTCT and only 15% knew that HIV can be transmitted from the mother to the infant by breastfeeding [85].

2.5 Recommended PMTCT implementation strategy in Tanzania

2.5.1 Laboratory diagnosis in PMTCT

According to the PMTCT National guidelines in Tanzania [37], all pregnant women attending reproductive and child health (RCH) facilities at their first antenatal visit receive HIV pre-test counselling as a routine provider initiated (opt-out) service at the clinic. Nationally, diagnosis of HIV is established by detecting HIV antibodies using three simple rapid tests, namely Bioline™ (Standard Diagnostic Inc. Kyunggi-do, Korea), Determine® (Abbott Laboratories, Il, USA) and Uni-Gold™ HIV (Trinity Biotech PLC., Bray, Ireland), by following the National HIV rapid testing algorithm illustrated in Figure2-1. All pregnant women who are tested for HIV should receive post-test counselling regardless of their HIV status and the HIV results should be given in person on the same day.

2.5.2 Antenatal Services for HIV-Positive women

Antenatal care for HIV-positive women includes the same basic services like all other pregnant women. However, obstetric and medical care for HIV-positive pregnant women is theoretically expanded to address the specific needs of infected women such as assessment and prompt treatment of HIV-related infections, provision of ARV prophylaxis, counselling on safer infant feeding and referral of the mother to CTC for assessment of eligibility for HIV treatment [37]. This is done through clinical staging or CD4 counts. However, the latter is not usually available through most PMTCT centres in Tanzania.

HIV-positive women should be given referrals for ongoing follow up, HIV care and assessment of treatment for themselves, their partners, their HIV-exposed infants and other family members. Under the National guidelines, ARV treatment is recommended for HIV-infected pregnant women in the following situations; WHO stage IV disease, regardless of CD4 count,

WHO stage III disease and CD4 count less than 350cells/mm^3 or if she has a CD4 count of less than 200 cells/mm^3 [37].

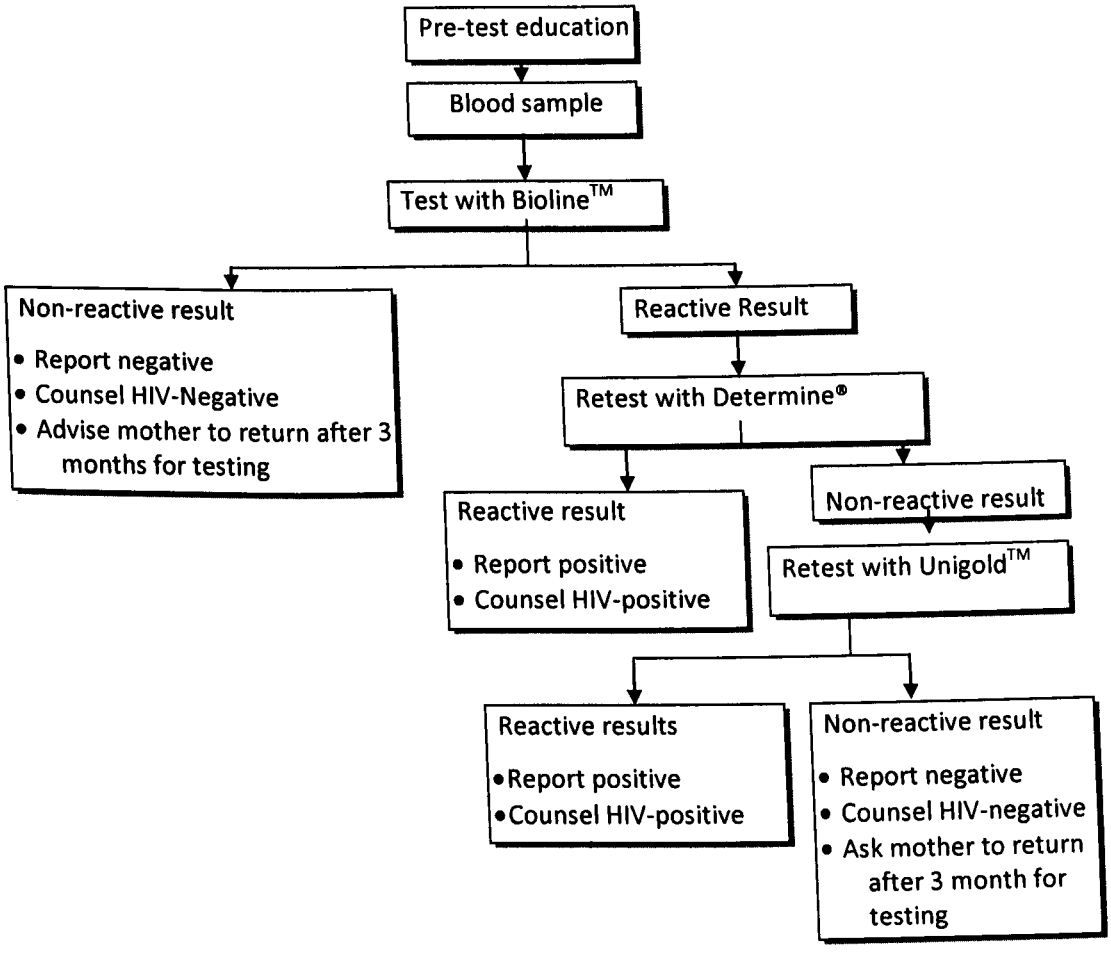
2.5.3 Intrapartum and postnatal services to HIV-positive women

Although it is difficult to offer counselling or obtain informed consent for HIV testing during labour, it is of great importance in areas where PMTCT is at an initial scaling up stage since most pregnant women miss this opportunity during the ANC period. Therefore, in Tanzania it is recommended that all pregnant women admitted for delivery in early labour with unknown HIV status receive routine pre-test education and, if consented, a rapid HIV test is performed so that ARV prophylaxis for PMTCT can be administered before delivery if the woman is found to be HIV-positive.

Women with known HIV-positive status who are already on a HAART regimen considered safe in pregnancy continue taking their medication during labour and delivery. All medication administered during delivery should be documented in the PMTCT register books accordingly. HIV-positive women who fail to deliver in a health care facility are advised to bring the newborn infants to the health facility within 72 hours after delivery to receive ARV prophylaxis for PMTCT.

Postnatal care for HIV-positive mothers include on-going care at maternal and child health (MCH) clinics for postpartum follow up and close coordination with the HIV care and treatment centres (CTC) staff to address HIV related emotional and clinical issues. The postnatal examination is specifically directed towards eliciting signs and symptoms suggestive of physical illness and emotional stress in the mother.

Figure 2-1 The National HIV-Rapid Testing Algorithm for PMTCT.



Source: Tanzania National PMTCT guidelines: May 2007 [37]

2.5.4 ARV prophylaxis for PMTCT for mothers and infants

According to the Tanzanian PMTCT guidelines of 2007, HIV-positive pregnant women who are not eligible for ARV treatment for their own health should receive ARV prophylaxis for PMTCT [37]. Recommended approaches to ARV prophylaxis are described below.

2.5.4.1 *ARV prophylaxis if the pregnant woman tested HIV-positive during pregnancy at ANC*

It is recommended that if the HIV-positive pregnant woman presents at an ANC that has the capacity to initiate ARV treatment and the ARV medication is available, and she does not need ARV treatment for her own stage of disease, she should be given AZT 300mg BD from 28 weeks or anytime thereafter during ANC. At the onset of labour, she should receive sdNVP 200 mg, AZT 300mg and 3TC 150mg. She is asked to continue with AZT 300mg every 3hrs and 3TC 150mg every 12 hrs until delivery. During the postpartum period, she should continue on

AZT 300mg BD and 3TC 150 mg BD for 7 days. For the infant, sdNVP 2mg/kg should be given as soon as possible after delivery and AZT syrup 4mg/kg BD for 4 weeks or 4mg/kg BD for 1 week if a mother received at least 4 weeks of AZT during ANC. This is illustrated in Table 2-1.

If the woman attends an ANC facility that has no capacity to initiate ARV drugs, she should be given a sdNVP 200 mg tablet at the 28th week visit or anytime thereafter to keep and she should be educated that the tablet should be taken at onset of true labour. If the woman delivers at the facility that has the capacity to initiate ARV treatment then during the postpartum period, she should receive AZT 300mg BD and 3TC 150 mg BD for 7 days. The infant should receive sdNVP as soon as possible after delivery or within 72 hrs. Similarly, if the woman deliver at the hospital that as the capacity to initiate ARV treatment, the infant should also receive AZT syrup 4mg/kg BD for 4 weeks (Table 2-1).

2.5.4.2 *ARV prophylaxis if the pregnant woman tested HIV-positive during labour at the maternity ward-before delivery*

According to the guidelines, if the woman tests HIV-positive at the maternity ward before delivery and has not been tested at ANC, she should receive a sdNVP 200 mg, AZT 300mg and 3TC 150m at the onset of labour then should continue with AZT 300mg every 3hrs and 3TC 150mg every 12 hrs until delivery. During the postpartum period, she should continue with AZT 300mg BD and 3TC 150 mg BD for 7 days. For the infant, sdNVP 2mg/kg should be given as soon as possible after delivery and AZT syrup 4mg/kg BD for 4 weeks (Table2-1).

2.5.4.3 *ARV prophylaxis if the pregnant woman tested HIV-positive during labour at the maternity ward-after delivery*

Infants of mothers who test HIV-positive after delivery are given sdNVP 2mg/kg as soon as possible after delivery and AZT syrup 4mg/kg BD for 4 weeks. ARV prophylaxis for the infants should be given as soon as the infant can tolerate oral feedings and within 12 hrs after delivery [37].

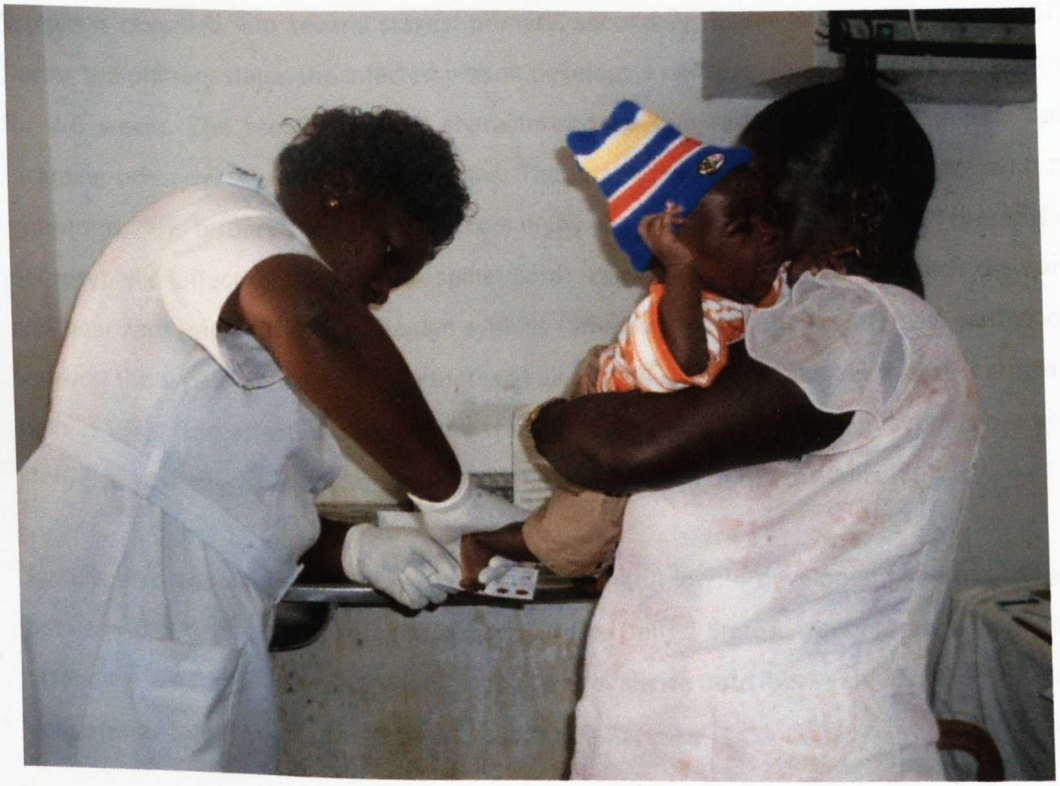
Table 2-2 ***Recommended prophylaxis regimes for PMTCT in Tanzania***

	Timing	Regimen & Dosage (2004 guidelines)	Regimen & Dosage (2007 guidelines)
Pregnant women testing HIV-positive during ANC & not eligible for ARV treatment	During ANC (Antenatal)	AZT 300 mg BD starting 36 weeks gestation	AZT 300 mg BD starting at 28 weeks gestation or anytime thereafter
	During labour (Intrapartum)	AZT 300mg every 3 hours from the beginning of labour to delivery **OR** sdNVP 200mg at onset of labour	sdNVP 200 mg +3TC 150mg at onset of labour Continue AZT 300 mg every 3 hours and 3TC every 12 hours until delivery
	After delivery (Postpartum)		AZT 300 mg BD + 3TC 150 mg BD for seven days
	Infants	sdNVP 2mg/kg within 72 hrs after delivery	sdNVP 2mg/kg **ASAP** after delivery **and** AZT syrup 4mg/kg BD for 4 weeks **or** 4mg/kg BD for 1 week if a mother received at least 4 weeks of AZT during ANC
Pregnant women who test HIV-positive during labour	During labour (Intrapartum)	sdNVP 200mg at onset of labour	SdNVP 200 mg + AZT 300 mg + 3TC 150mg at onset of labour. Continue AZT 300 mg every 3 hours and 3TC every 12 hours until delivery
	After delivery (Postpartum)		AZT 300 mg BD + 3TC 150 mg BD for seven days
	Infants	sdNVP 2mg/kg within 72 hrs after delivery	sdNVP 2mg/kg **ASAP** after delivery **and** AZT syrup 4mg/kg BD for 4 weeks
Mothers test HIV-positive after delivery	Infants	sdNVP 2mg/kg within 72 hrs after delivery	sdNVP 2mg/kg **ASAP** after delivery **and** AZT syrup 4mg/kg BD for 4 weeks

2.5.5 HIV-exposed infant's assessment of HIV status

The National guidelines recommended that HIV-exposed infants born in a health facility receive an MCH card in which the ARV prophylaxis for PMTCT is indicated [37]. Infants should be seen in the health care facility or at home within one week of delivery or sooner to monitor feeding progress. Follow up visits for HIV-exposed infants are scheduled to coincide with the recommended immunisation schedule at the first, second and third months post-delivery and thereafter during routine growth monitoring scheduled visits as indicated on the MCH card (that is, monthly up to one year and then 3 monthly up to 5 years). A full clinical re-assessment including growth and development is done at each follow up visit [37, 86].

Figure 2-2 Blood sample (DBS) collection for the PCR test at STRH



Source: field data

The guidelines recommend that HIV-exposed infants be given cotrimoxazole preventive therapy (CPT) starting from four weeks onwards at 5mg/kg dosage. CPT is continued until the child is proven to be HIV antibody negative. Infants exposed to HIV may test HIV-positive on HIV antibody testing for up to 18 months due to persistence of maternal antibodies transferred across the placenta. Therefore, antibody testing for HIV infection with using conventional ELISA is performed at 18 months if the child is no longer breastfeeding. If a child

is still breastfeeding at 18 months, the test is done six weeks after stopping breastfeeding. Earlier diagnosis is possible using HIV PCR, which detects HIV DNA. The test can be done at four weeks after birth. If the initial PCR is positive, a repeat test is recommended before disclosure of the result [86]. Currently in Tanzania HIV PCR testing is available at the Muhimbili National Hospital in Dar-es Salaam and two referral hospitals, namely, Bugando Medical Centre (BMC) in Mwanza and at the Kilimanjaro Christian Medical Centre (KCMC) in Moshi.

2.6 *Maternal syphilis global overview*

Syphilis is a bacterial infection caused by *Treponema pallidum* and is usually sexually transmitted. It is a curable infection, which if left untreated, can eventually lead to irreversible damage to the heart and nervous system.

Syphilis is classified into several stages: primary, secondary, latent and tertiary stages [87]. During the primary stage, the infected person develops a painless ulcer (chancre), which lasts for 2-6 weeks. The second stage is characterised by skin rashes, fever and muscle pain including other symptoms as well as signs. The latent phase is the dormant stage with no symptoms. The tertiary stage usually occurs many years after initial infection and presents as neurosyphilis (affecting the brain or spinal cord), cardiovascular syphilis (in which the aorta and heart are infected) or late benign syphilis (affecting the skin). An infected mother can transmit the syphilis infection to the foetus at all stage but the risk is higher in earlier stages of syphilis [88]. The infection can also be transmitted by blood transfusion. Syphilis has been identified as a principal cofactor facilitating the transmission of HIV in adults [89].

Syphilis sero-prevalence during pregnancy is in general low in developed countries, ranging between 0.02% in Europe to 4.5% in parts of the United States. Among pregnant women attending antenatal clinics in Africa, syphilis prevalence rate between 3% and 18% have consistently been reported at antenatal clinics [90-91]

2.6.1 Impact of maternal syphilis on pregnancy outcome

Syphilis infection in pregnant women has long been recognized as a major factor for adverse perinatal and maternal outcomes [92-93]. Common documented adverse pregnancy outcomes of women infected with syphilis includes stillbirth, spontaneous abortion [94], neonatal death, perinatal death and neonatal syphilis infection or congenital syphilis [92]. Others are low birth weight, prematurity and intrauterine growth retardation [95]. A retrospective cohort study conducted among pregnant women admitted for delivery in

Mwanza region, Tanzania, found that 49% of women with untreated high titre syphilis experienced an adverse pregnancy outcome compared to 11% of uninfected women [96].

2.6.2 Congenital syphilis

Congenital syphilis occurs when the pregnant woman passes *Treponema pallidum,* the causative agent of syphilis, to her unborn baby. There is a 70% probability of an untreated pregnant woman transmitting the infection to her foetus within four years after acquiring syphilis [97]. More than 50% of live born infants with congenital syphilis develop serious problems such as blindness and/or deafness and developmental disability later in life. Currently, WHO estimates that up to 1.4 million cases of congenital syphilis occur worldwide each year [6] this is more than twice the UNAIDS' estimates of the 530,000 children under 15 years who are annually infected with HIV [13]. Congenital syphilis following untreated maternal infection is preventable when infected women are identified and treated appropriately as early in pregnancy as possible.

2.6.3 Interventions to prevent congenital syphilis

The basis of the prevention of congenital syphilis and other sequalae of untreated maternal syphilis has been syphilis screening and treatment during pregnancy. Vertical transmission of congenital syphilis most commonly occurs after 4 months of gestation. Thus, an approach to early antenatal screening and appropriate treatment is important in order to prevent most cases of foetal infections.

2.6.3.1 *Syphilis diagnosis in pregnant women*

Due to asymptomatic infection, screening for syphilis needs laboratory tests. Syphilis tests fall into four groups [98]:

1. Direct microscopic examination- used when lesion(s) are present;
2. Non treponemal tests– used for screening;
3. Treponemal tests–used as confirmatory tests; and
4. Direct antigen detection tests – gold standards for test evaluation.

Syphilis screening is traditionally performed using non-treponemal tests such as the rapid plasma reagin (RPR) or Venereal Disease Research Laboratory (VDRL) assays [99]. RPR and VDRL are helpful indicators of syphilis infection and are cheaper to perform than treponemal tests. However, their sensitivity varies according to the stage of the disease while their specificity is low in certain settings and false positive results are encountered [93], especially

in pregnant women due to factors such as malaria, tuberculosis and viral fever. Thus, it leads to over treatment. Furthermore, it takes 10-45 days for the infection to be detected by a non-treponemal blood test and therefore, a single initial negative test does not prove absence of the infection. Pregnant women who are negative on the first test should ideally be screened again later in pregnancy or at delivery but in practice, that rarely happens.

Ideally, non-treponemal tests (RPR and VDRL) should be confirmed by treponemal tests. These include the Treponemal Pallidum Haemagglutination Assay (TPHA) or Treponemal Pallidum Particle Agglutination (TPPA) assay. Treponemal tests have higher sensitivity and specificity but are expensive, they require a laboratory with trained personnel, refrigeration for the storage of reagents, electricity to run equipments and they cannot distinguish between current and past infections [100].

Treponemal rapid, simple and effective screening tests are now becoming available. Such point-of-care (POC) tests can use both whole blood from finger prick or serum or plasma. They do not require access to a laboratory or refrigeration. They offer a practical alternative to traditional techniques and have the potential to change the whole approach to syphilis testing even in primary health care settings [101-102]. Because the results can be available immediately (within 20-30 minutes), women can be tested and receive treatment on the same visit. Rapid tests cost between US$ 0.93-1.44 per screened woman [9]. Although this is more than the cost of the previously standard tests, rapid tests are in fact more cost-effective, since women can be tested and treated in a timely manner such that more cases of congenital syphilis prevented. However, like non-rapid treponemal tests, these POC test cannot distinguish between past and current infections.

2.6.3.2 *Syphilis treatment in pregnant women*

According to the CDC recommendations of 2006 [103], when syphilis is diagnosed in pregnant women, the treatment should consist of the penicillin regimen appropriate for her stage of syphilis. For primary, secondary and early latent syphilis, the recommended treatment is benzathine penicillin G, 2.4 million units (m.u) IM in a single dose. For late latent syphilis or syphilis of unknown duration, benzathine penicillin G, 7.2 million unit (m.u) total is recommended, administered in three doses of 2.4 m.u IM each at one-week intervals.

For pregnant women allergic to penicillin, the recommendations are to desensitize and treat them with penicillin if this is possible. HIV-positive pregnant women with early syphilis

infection may be at high risk of neurologic complications, which may increase the treatment failure with benzathine penicillin, and therefore, careful follow up after therapy is recommended.

A study conducted in Mwanza, Tanzania, to estimate the cost effectiveness of onsite antenatal syphilis screening and treatment found that the economic cost was $1.44 per women screened and the cost effectiveness was $10.56 per disability adjusted lost years (DALY) saved [9]. When compared to preventing mother-to-child transmission of HIV, prevention of congenital syphilis (CS) found to be inexpensive, simple and highly cost effective [8-9]. Thus, prevention of syphilis in pregnant women by screening with new, simple rapid tests and treating using benzathine penicillin is likely to be cost effective and affordable for countries with limited resources.

2.7 *Challenges to the implementation of maternal syphilis screening*

Even though syphilis has long been known as an important cause of morbidity and mortality among pregnant women, and maternal syphilis screening and treatment are relatively feasible and effective. Such an intervention has not been fully available to the majority of the pregnant women in developing countries. Even in countries with maternal syphilis screening as a national policy and wide utilization of antenatal care services, syphilis screening among pregnant women appears to be low [104]. Reasons for low maternal syphilis screening among pregnant women include:

1. Not attending the ANC clinic in pregnancy;
2. Lack of services at ANC clinics, that is,
    a. Syphilis screening services not offered,
    b. Run out of test kits and/or treatment,
    c. Unavailability of trained staff;
3. Not returning for test results to facilities which implement offsite syphilis testing;
4. Lack of screening and treatment of partners;
5. Late attendance for antenatal care during pregnancy;
6. Refusing to take a test.

Similarly, maternal syphilis screening and treatment in Tanzania faces many of these challenges. A study conducted in Tanzania in 2000/2001 to examine maternal syphilis screening and its operational implementation in antenatal clinics documented a failure in effective implementation of syphilis screening programmes in the country. About 57% of

pregnant women who attended the ANC services were not screened for syphilis due to a lack of trained health workers to perform the RPR test, lack of supplies and poor supervision as well as quality control. Of those who were screened and found RPR-positive, only 61% were treated and only 37% had partners who came for treatment [96].

In Zambia, although 90% of pregnant women attended prenatal services and syphilis screening was mandatory according the government policy, there were many barriers to its effective implementation. They included late attendance to ANC, not being offered a test, failure to give treatment to male partners, which resulted in re-infection, and failure to recognise infection acquired late in pregnancy [88].

Case studies in Bolivia, Kenya and South Africa found that in many antenatal care facilities there were no syphilis screening and treatment guidelines and women attended the antenatal services late in pregnancy and thus, made it difficult for timely detection and treatment of syphilis. Furthermore, knowledge about syphilis was limited among pregnant women and health education talks and counselling was not put into practice [105].

2.8 *Maternal Syphilis screening in Tanzania*

Maternal syphilis screening is a national policy in Tanzania [106]. It is recommended that all pregnant women attending ANC clinic for their first visit during that pregnancy should be screened with the rapid plasma reagin (RPR) test. It is recommended that syphilis screening should be done on site and results and treatment made available to the pregnant women on the same day before they leave the clinic. Furthermore, it is recommended that women, at each antenatal visit, should be asked about STI symptoms in themselves and in their partners. When syphilis is diagnosed, the recommended treatment is benzathine penicillin 2.4-m.u IM single dose given as two injections at separate anatomical sites.

Theoretically, at the time of delivery, syphilis test results should be reviewed, and the infant evaluated for signs of CS. It is recommended that women who missed an RPR test during antenatal care should be tested during delivery and the test results should be obtained as soon as possible so that early treatment can be given to the infants of women who test positive and to the mothers.

All infants born to RPR positive mothers with signs of congenital syphilis such as vesicular eruptions on palms or soles, hepatosplenomegaly, pseudoparalysis, oedema/ascites, fever (in

the first week of life), prolonged or conjugated hyperbilirubinaemia, petechiae, bleeding and syphilitic facies, should be treated with single dose benzathine penicillin 50,000 iu/kg regardless of whether the mothers were treated during pregnancy or not. Infants who have signs of congenital syphilis and who are born to mothers with unknown syphilis status should be started on treatment and their mothers should be tested.

CHAPTER 3: AIMS OF THE STUDY

3.1 Rationale for research studies presented in this thesis

Literature on prevention of mother-to-child transmission (PMTCT) of HIV and maternal syphilis screening and treatment programmes in Tanzania reveal that little has been documented on accessibility and utilization of these services. To date, no study has documented the proportion of women who successfully completed the programmes and the reasons for non-completion of these interventions are not known.

Although there are clear guidelines for PMTCT and syphilis screening and treatment during pregnancy in Tanzania, it is not known how effective and practical they are at ANC clinics and during delivery. Therefore, there is a need to document what works and what does not.

Maternal viral load is an important risk factor for mother-to-child (MTCT) of HIV, and it has been confirmed that ARV medication decreases HIV viral load, which reduces an infant's exposure to HIV. In Tanzania, no studies have documented whether HIV-positive pregnant women, identified through PMTCT, receive proper referrals for their own care and treatment before delivery, and whether they attend their referrals. Reasons for non-attendance are not known. In this study, we examine the referral procedures for HIV women identified through PMTCT to a CTC, determine the attendance rates at the care and treatment clinic (CTC), and explore reasons for non-attendance.

Breastfeeding is an important risk factor for MTCT of HIV, especially in resource poor countries like Tanzania, where replacement feeding is often not acceptable, feasible, affordable, sustainable or safe. While counselling on infant feeding is of great importance to all HIV-positive mothers, little is known about the impact of counselling on infant feeding among HIV-positive women and whether women adhere to their planned infant feeding methods.

Despite having maternal syphilis screening and treatment as a national policy, the rollout of PMTCT since 2004 and the wide use of antenatal services in Tanzania, the majority of the pregnant women still present to the hospital for delivery without being screened for syphilis and with unknown HIV status. In this study, we determine the factors that contributed to the failure of the implementation of these two important maternal and reproductive health programs at the individual and health facility levels in Mwanza Region.

A study conducted in 2000/2001 in nine districts in Tanzania to examine maternal syphilis screening and treatment and its operational implementation in ANC revealed a failure in the implementation of the programmes [96]. The introduction of PMTCT in Tanzania is an excellent opportunity to offer other maternal health related interventions such as syphilis screening and treatment. In this research, we assess and document the extent of integration of PMTCT and maternal syphilis screening and treatment services at the facility level in Mwanza-Tanzania.

Different sub-studies conducted for this research and presented in this thesis we evaluates general knowledge about MTCT of HIV and syphilis among health workers and pregnant women and assess the quality of the information given to pregnant women during counselling sessions at public ANC clinics in Mwanza-Tanzania.

3.2 Conceptual framework

Figure 3-1 demonstrates the conceptual framework that was used to select the research methods and to prepare the data collection tools. From the literature review, various factors have been documented to influence pregnant women's accessibility to PMTCT and maternal syphilis screening and treatment. Access to PMTCT and maternal syphilis screening and treatment is determined to some extent by the individual situation, the health systems and policy factors as well as the community factors. The roles of these factors in hindering the successful implementation of the programmes for pregnant women must be addressed.

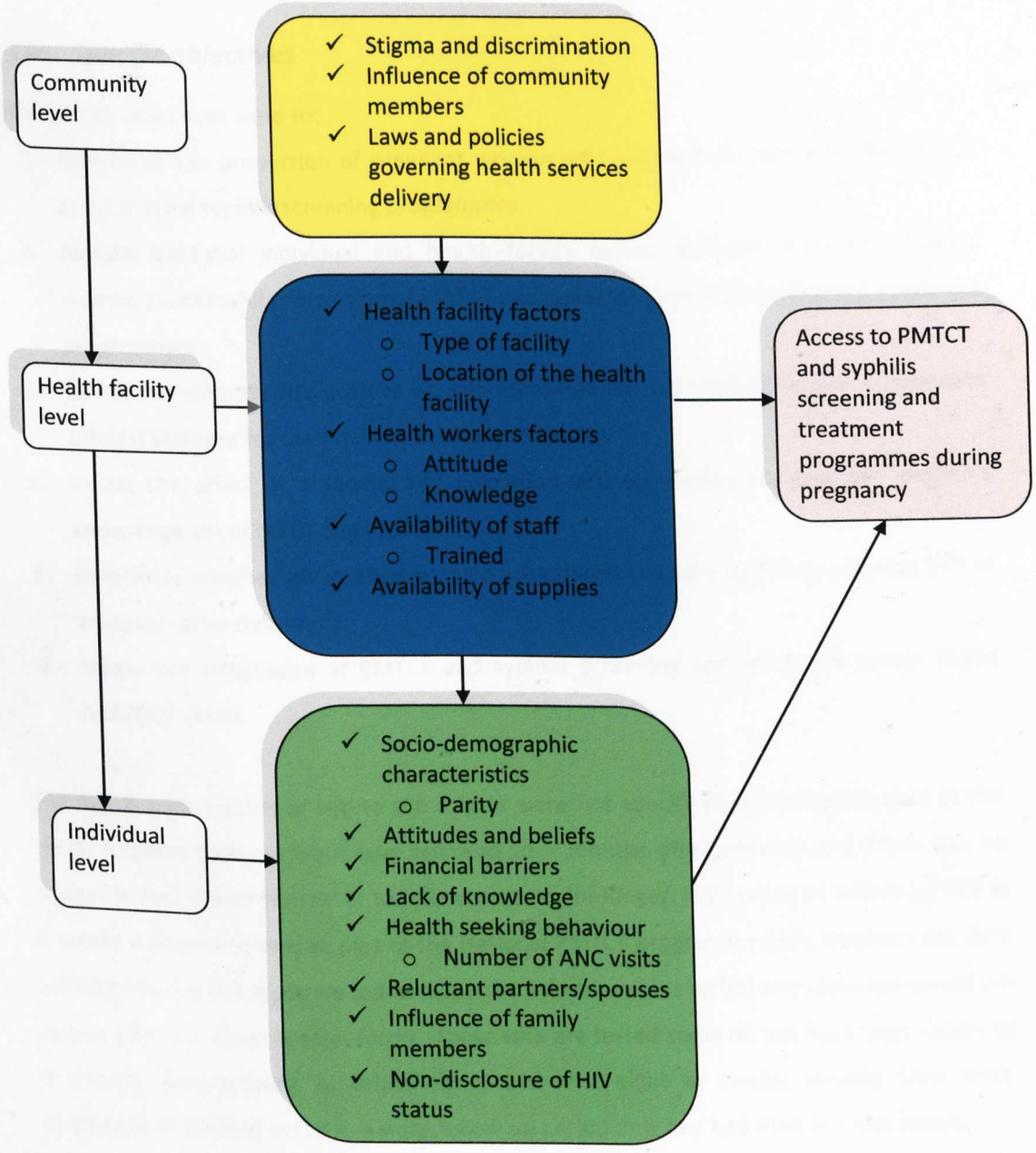
The yellow box represents the community level factors these factors indirectly affect the women's decisions regarding access to services. While community factors such as levels of HIV-related stigma can influence health systems e.g. through health workers' behaviour towards HIV-positive women, individual-level factors such as lack of knowledge, financial barrier or influence of family members, health seeking behaviour can directly affect an individual's decision to access PMTCT and maternal syphilis screening and treatment services.

The blue box represents health systems factors. These factors are also influenced by policy as well as some community factors. Health systems factors can have both a direct and an indirect effect on decisions to access services.

The green box represents the individual factors affecting pregnant women's health-seeking behaviour. These factors are likely to be different for each individual within the study, while

the community and health systems factors are likely to be quite similar for all individuals attending the same study facility.

Figure 3-1 Factors contributing to the effectiveness of PMTCT and syphilis screening and treatment programmes in Tanzania



3.3 Study aims

The broad aim of the studies described in this thesis was to assess the operational performance of PMTCT and antenatal syphilis screening and treatment during pregnancy, delivery and in the postnatal period within public health facilities in Mwanza City; northwest Tanzania

3.4 Specific objectives

The specific objectives were to:

1. Determine the proportion of pregnant women who successfully complete the PMTCT and maternal syphilis screening programmes.
2. Identify potential individual and health facility factors that are likely to influence women's successful completion of PMTCT and maternal syphilis screening and treatment programmes.
3. Determine whether HIV-positive women identified through PMTCT receive appropriate referral and care for their own health concerning HIV.
4. Assess the effect of antenatal HIV education and counselling on pregnant women's knowledge about MTCT and PMTCT.
5. Determine whether HIV-positive women are offered and take up family planning (FP) as an option after delivery.
6. Assess the integration of PMTCT and syphilis screening and treatment within public ANC/RCH clinics.

The actual transmission of HIV to the infants were not specifically examined as part of this thesis because mothers were only followed to 4 months after delivery and there was no budget to test infants for HIV or to follow mothers for longer. HIV testing of infants by PCR at 4 weeks is recommended as part of the National PMTCT programme [37], but from the data collected during this study we found that many infants are not tested and some are tested but not on time (i.e. 4 weeks after birth). Those who are tested some do not have their results by 4 months post-delivery, especially those who test eight or twelve months after birth. Therefore, at the end of the 4 months follow up period only few had their HIV test results.

Early HIV infection is associated with increased HIV-1 viraemia[107], therefore, HIV seroconversion during pregnancy or breastfeeding could increase the risk of MTCT of HIV. Studies conducted in Tanzania and South Africa report that about 3% and 5% of pregnant

women who initially test HIV negative at ANC sero-convert prior to delivery and/or during breastfeeding, respectively[108-109] . This study observed what was done in the actual programmes. In Tanzanian the PMTCT programme do not retest women at delivery if they tested HIV negative at the ANC and as a result, we had no way of measuring incident HIV infection in mothers during pregnancy or breastfeeding as part of the cohort study.

Infants born to women who test RPR-positive during pregnancy were not followed up to determine if they developed signs and symptoms of congenital syphilis, because, according to the National guidelines for management of sexually transmitted and reproductive tract infections, these infants should be treated at birth regardless of whether the mother was treated during pregnancy or the infant is having any signs of congenital syphilis.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

This Chapter presents research methodology under the following sections: study area, data collection methods and sample size calculation. Other sections include data management and ethical considerations.

4.2 Study area

The study was conducted in Mwanza city, an administrative capital for Mwanza region. The region is located northwest in the United Republic of Tanzania. Tanzania is the largest country in East Africa covering 940,000 square kilometres, 60,000 of which are inland water. Tanzania lies south of the equator and shares borders with eight other countries namely: Kenya and Uganda to the north; Rwanda, Burundi, Democratic Republic of Congo, and Zambia to the west; and Malawi and Mozambique to the south. In 2002 the total population was about 34.4 million (51% women, 46% under age 15 years and 8% aged over 54 years) [12].

HIV prevalence in the general population in Tanzania is estimated to be 7% and the main mode of transmission is through heterosexual transmission and MTCT [10]. The surveillance of HIV and syphilis infections among ANC clinic attendees in Tanzania in 2003/2004 reported an overall HIV and syphilis prevalence of 8.4% and 7.3% respectively [110].

Mwanza region covers an area of 35,872 square kilometres. According to the last National census in 2002, the region has a population of about 3 million [111]. The main ethnic groups in Mwanza region are the Sukuma, Zinza, Haya, Sumbwa, Nyamwezi, Luo, Kurya, Jita and Kerewe. The Sukuma tribe constitutes over 90% of the population in this region. The rest of the groups constitute various smaller proportions. The population of Mwanza Region has been estimated to consist of approximately one-third of Muslims, one-third of Christians and one-third followers of traditional religion [111]. The local language in Mwanza region is Sukuma; however Swahili is the official national language and is used in all public sectors and in conversation between different tribes. Mwanza Region is administratively divided into eight districts. Mwanza city is composed of two districts, Nyamagana and Ilemera. Mwanza city is the second largest city in Tanzania and had an estimated population of 474,679 in 2002 [111].

Three antenatal care (ANC) clinics (Makongoro, Igoma Nyamagana(previously known as Butimba) in Mwanza city and two delivery sites, Bugando Medical Centre (BMC) a large

tertiary referral hospital, and Sekou-Toure Regional Hospital (STRH), participated in the study. The two hospitals are the largest in the city and they provide delivery services for most of the women attending public and private ANC clinics in Mwanza city. Since most of the private ANC clinics in Mwanza city operate independently, (i.e. they are not situated in hospitals), the majority of pregnant women attending these facilities during pregnancy deliver at BMC or STRH. At BMC, there is also an ANC clinic for pregnant women who have complications during pregnancy and who receive referral to BMC from their local ANC clinics.

Both BMC and STRH have care and treatment clinics (CTC) that offer services to HIV-positive individuals including pregnant women who are identified as HIV-positive through PMTCT and who receive referral from ANC to attend a CTC at one of these hospitals. Pregnant women referred to these hospitals, follow the same HIV assessment protocol as any other HIV individuals attending the clinic.

Figure 4-1 Map of Tanzania

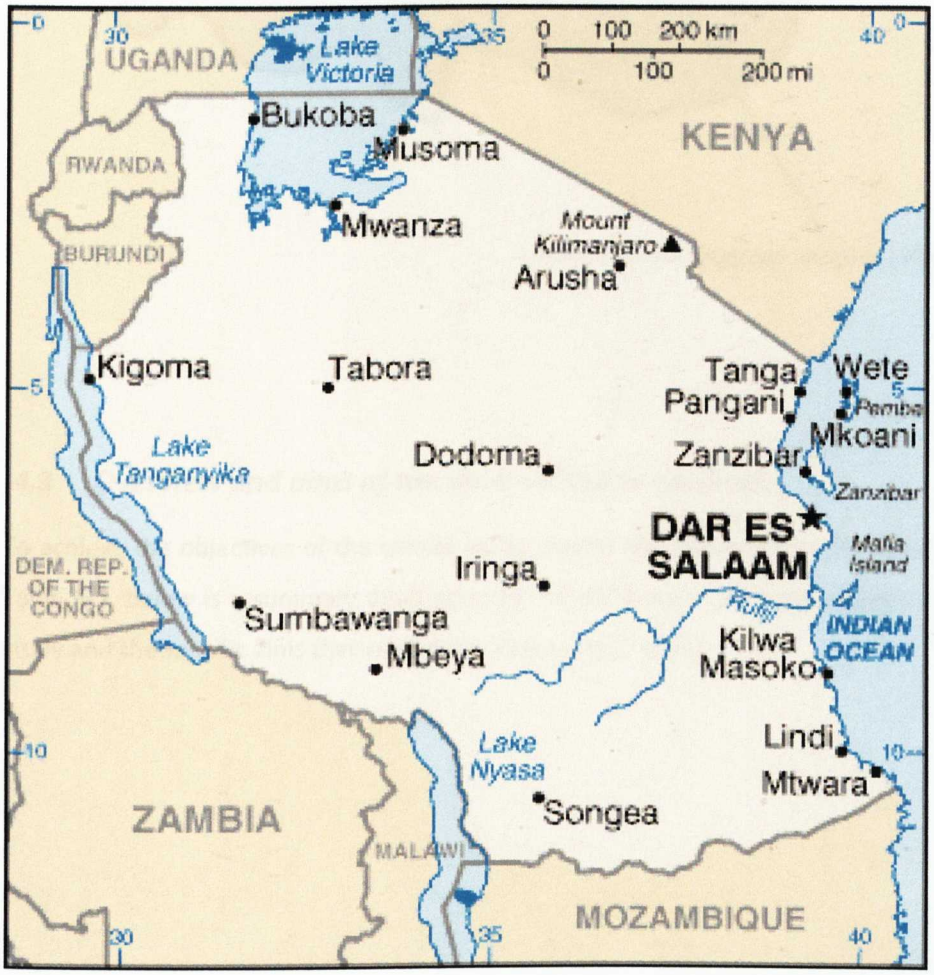
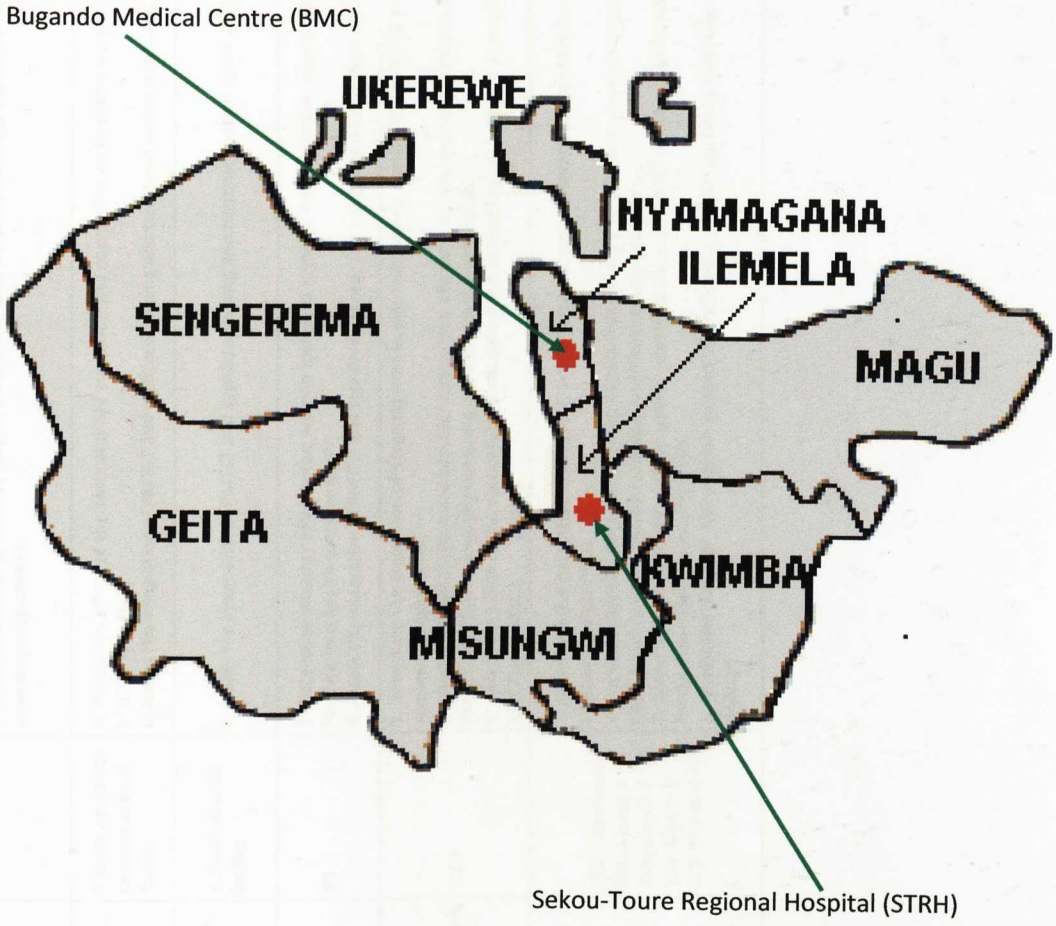


Figure 4-2 Map of Mwanza Region



4.3 Overview and aims of the data collection methods

To achieve the objectives of the overall study several observational studies were conducted. Table 4-2, below is a summary description of the different study methodologies used in the study and the specific aims that were addressed by each study.

Table 4-1 Study types, sites, participants and objectives

Study name	*Sites*	*Participants*	*Number seen*	*Addressed study objectives*
Review of the health facility record books	Makongoro, NDH[1], Igoma RCH, BMC[2] and STRH[3]	Facility record syphilis screening and PMTCT record books		1. Determine the proportion of pregnant women who successfully complete the PMTCT and maternal syphilis screening programmes.
Observation of health education	Makongoro, NDH and Igoma HC.	Pregnant women attending ANC for the 1st time during the current pregnancy	3 heath education sessions at each facility	4. Assess the effect of the antenatal HIV education and counselling on pregnant women's knowledge about MTCT and PMTCT. 6. Assess the integration of PMTCT and syphilis screening and treatment within public ANC/RCH clinics.
Observation of the clinic activity flow	NDH, Igoma HC, and Makongoro RCH	Pregnant women attending ANC for the 1st time during the current pregnancy	2 clients at each facility	6. Assess the integration of PMTCT and syphilis screening and treatment within public ANC/RCH clinics.
Health workers interviews	BMC, STRH, NDH, Igoma HC & Makongoro RCH	Health workers in ANC and maternity wards	89	3. Determine whether HIV-positive women identified through PMTCT receive appropriate referral and care for their own health concerning HIV. 6. Assess the integration of PMTCT and syphilis screening and treatment within public ANC/RCH clinics.
Cross-sectional study	BMC & STRH	All women who delivered during the study period	1157	1. Determine the proportion of pregnant women who successfully complete the PMTCT and maternal syphilis screening programmes. 2. Identify potential client and provider factors that are likely to influence women's successful completion of PMTCT and maternal syphilis screening and treatment programmes. 4. Assess the effect of the antenatal HIV education and counselling on pregnant women's knowledge about MTCT and PMTCT.
Cohort study	BMC & STRH for cohort recruitment Several RCH clinics in Mwanza city where women attended under five clinics	All eligible HIV-positive women who delivered during the study period	403- recruitment 361- Month 1 FU 331- Month 2 FU 316- Month 3 FU 328- Month 4 FU	1. Determine the proportion of pregnant women who successfully complete the PMTCT and maternal syphilis screening programmes. 2. Identify potential client and provider factors that are likely to influence women's successful completion of PMTCT and maternal syphilis screening and treatment programmes. 3. Determine whether HIV-positive women identified through PMTCT receive appropriate referral and care for their own health concerning HIV. 5. Determine whether HIV-positive women are offered and take up family planning as an option after delivery

[1]Nyamagana District hospital

[2]Bugando Medical Centre

[3] Sekou-Toure Regional Hospital

4.4 *Situational analysis at the antenatal clinics and maternity wards in Mwanza*

A situational analysis comprising of retrospective data collection and observation of the clinic activities was conducted at the three participating ANC clinics. These included Makongoro, a large regional reproductive and child health clinic situated in the centre of Mwanza city, Nyamagana clinic located at Nyamagana district hospital in the southern part of the city and Igoma health Centre located on the road leading East out of the city.

4.4.1 Review of the health facility record books

In order to assess the utilization of PMTCT and syphilis screening and treatment services, review of the ANC clinic record books at Makongoro, NDH and Igoma ANC clinics were conducted by the principal investigator. This review provided information regarding service utilization between 1st September 2007 and 31st August 2008, 12 months prior to the commencement of this PMTCT and Syphilis study in September 2008.

Record books that were reviewed at the ANC facilities included ANC register book, syphilis screening and treatment register book and a PMTCT register book. However, some of these books were not available; in such a case instead of the books, the monthly reports were used. Table 4-2 shows the information that was collected from each book.

A structured form was used to collect data for this review and included:

1. The total numbers of pregnant women attending the facility for the first ANC visit in that pregnancy;
2. The total number of pregnant women tested for syphilis at that visit;
3. The total number of pregnant women with positive RPR results;
4. The total number of syphilis positive pregnant women treated;
5. The total number of pregnant women offered, accepted and tested for HIV for PMTCT;
6. The total number of pregnant women who tested positive for HIV;

7. The total number of HIV-positive pregnant women who were referred to a care and treatment centre (CTC) for assessment of HIV infection before delivery;
8. The total number of HIV-positive pregnant women who were given ARV prophylaxis.

Table 4-2 ANC register books

Name of the register book	Information recorded in the register book
ANC register book	✓ Document details of all pregnant women attending ANC for the first time during the current pregnancy o Date of attendance o Name o Age/date of birth o Address o LMP date o Clinic number o Gravidity
Syphilis screening and treatment	✓ Document details of women who are screened for syphilis during pregnancy o Date o Name o Clinic number o RPR results ▪ For RPR positive • whether treated • Date of treatment (Makongoro & Igoma ANC)
PMTCT ANC counselling daily register book	✓ Document details of women tested for HIV at ANC o Registration number o Name o Age o Date of HIV test o HIV results o ARV given o Date ARV given o Other information not in register (separate log book and on summary forms ▪ Referral to CTC ▪ Date partner tested ▪ Partner's HIV test results

Similarly, a review of the maternity ward record books was conducted at BMC and STRH. At the maternity wards two types of record books were reviewed and these were the delivery register

books and the PMTCT maternity register books. Details of each register book are shown in Table 4-3. Examination of these records provided information on whether PMTCT services had been offered, either at the ANC or delivery suite to women admitted for delivery at the two maternity wards over the past 12 months.

Table 4-3 Maternity ward register books

Name of the register book	Information recorded in the register book
Delivery register book	✓ Date of delivery ✓ Registration number ✓ Mother's name ✓ Mother's age ✓ Gravidity ✓ Birth outcome ✓ Sex of infant ✓ Weight of the infant
PMTCT maternity register book	✓ Date ✓ Registration number ✓ Information on mothers o Age o HIV status from ANC (Positive, Negative or Unknown) o For the case of unknown HIV status ▪ HIV test results at/after delivery (Positive, negative or unknown) ▪ For HIV-positive mothers • If the woman took NVP or other ARV (AZT) • If woman use ARV during labour ▪ For HIV-exposed infants • If the infant received NVP • Infant feeding option ✓ On a different log book they recorded women who were referred to CTC

A structure form was used to collect information on:

1. The total number of women admitted for delivery;
2. The total number of women admitted for delivery who had tested for HIV at ANC;
3. The total number of women admitted for delivery who had a known HIV-positive status from ANC;
4. The total number of women admitted for delivery with unknown HIV status from ANC and who were tested for HIV at the maternity ward;
5. The total number of women tested at the maternity wards who were HIV-positive;
6. The total number of HIV-positive women admitted for delivery who were referred to a CTC prior to delivery;
7. The total number of HIV-positive women admitted for delivery who attended a CTC and received HAART before delivery;
8. The total number of HIV-positive women admitted for delivery who received ARV for PMTCT;
9. The total number of HIV-positive women admitted for delivery whose infants received ARV for PMTCT prior discharge from the hospital;
10. The total number of HIV-positive women admitted for delivery who intended to breastfeed their infants;
11. The total number of HIV-positive women admitted for delivery who intended to use replacement feeding for their infants;

4.4.2 Participant observation

Two types of observations were conducted at the ANC facility in order to understand the flow of the activities at the facility and the content of the health education talk offered to the pregnant women at their first visit to the ANC during pregnancy. The purposes of these observations were clearly explained to the health facility workers during the introductory meetings.

4.4.2.1 *Observation of health education*

On three different occasions between 8th September 2008 and 25th June 2009, participant observation were conducted to observe the health education talk (group pre-HIV test counselling) at each study ANC facility. A modified tool adapted from the 2007 UNAIDS tools for evaluating quality and contents of counselling for HIV testing uptake [112] (Annex 1) was used to document all key points covered during the health education talks and to assess the quality including content of the information that was given to the pregnant women. All questions raised by pregnant women attending such sessions were documented by the observer, along with responses from the health care personnel delivering the counselling and health education talks.

Figure 4-3 Health education sessions at NDH ANC clinic

Source: Field data

4.4.2.2 *Observation of the client flow within the antenatal clinics*

A research assistant (nurse midwifery) followed the movement of a pregnant woman attending the ANC for the first time during the current pregnancy in order to determine the services that were offered to her, the time she spent at each station in the ANC accessing different services and how long she was in the ANC facility for that visit. Two observations were conducted at each of the ANC facilities at Makongoro RCH clinic, Nyamagana district hospital (NDH) and Igoma health centre.

Women were selected randomly among women attending ANC for the first time during the current pregnancy and who arrived at the clinic before or soon after the official opening hours of the clinic. Women were given a unique number at arrival at the ANC starting with 1 (collecting numbers on arrival is a normal procedure at all the clinics so that those who come first should be attended first). Women were then asked to wait until enough have arrived before the clinic services commence. The research assistant examined the highest number (N) that was given to the last woman who arrived at the clinic before or soon after the commencement of the services. Then the research assistant communicated the highest number to the principal investigator via phone who randomly selected one number between 1 and N using a random number generator (http://www.random.org/integers/). The selected number was then communicated back to the research assistance via phone. A research assistant then approached women with the selected numbers; they were given information about the observation study and asked for oral informed consent. The research assistant recorded the time of arrival and she then watched the participant's movement through all the different procedures and different stations at the clinic.

During these observations, a research assistant did not enter the rooms while the woman was being attended to instead she recorded the time at entry and the time at exit so as to be able to calculate the time spent at each station. In addition, the time that the woman spent waiting for the services was also recorded. A map of how the women moved around the clinic to access the services and the total time spent at the clinic was obtained.

4.5 Health workers interviews

A structured questionnaire with open and closed questions was administered to 90 health worker staff at all the participating ANC clinics and the two maternity wards, Bugando Medical Centre (BMC) and Sekou-Toure Regional Hospital (STRH). Data gathered included key work activities, training received on PMTCT and syphilis diagnosis. Others included challenges that they have faced in implementing these services, knowledge about MTCT of HIV and syphilis and their perspective on utilization of PMTCT and syphilis screening services. These interviews took place during the entire period of the study (September 2008 to May 2009).

4.6 Cross-sectional study at the maternity wards

A cross-sectional study at BMC and STRH delivery suites was conducted in order to measure the proportion of pregnant women who were offered PMTCT services during pregnancy and who were screened and treated for syphilis at the ANC. This took place at the maternity wards on Monday to Friday over a period of one month between 8th September 2008 and 12th October 2008. Pregnant women admitted for delivery during Monday to Friday over the period specified above, were asked for written informed consent to participate in the study and a structured questionnaire was administered to all consenting women

During the cross-sectional study, data collected included socio-demographic characteristics, parity, gravidity, outcomes of previous pregnancies and past contraceptive use. In addition, data were collected about ANC services received for the current pregnancy including where participants attended for their antenatal care, whether they were screened for syphilis, if they had access to PMTCT services at the ANC/RCH and whether they were tested for HIV. For those not screened for either syphilis or HIV during pregnancy, information was collected on potential reasons they were not screened at that time. Other information collected included knowledge about syphilis, MTCT of HIV and syphilis, ways of preventing MTCT of HIV and syphilis and awareness of PMTCT and syphilis screening and treatment services during pregnancy.

4.7 Cohort study

A prospective cohort of 403 HIV-positive women was recruited at the two maternity wards (BMC and STRH) in Mwanza city over five months between 8th September 2008 and 20th February 2009. The main aim of this study was to determine the proportion of HIV-positive women who

successfully completed the PMTCT interventions in addition to other secondary aims as indicated in Table 4-1.

4.7.1 Inclusion criteria

Inclusion criteria included being admitted to the labour ward for delivery, known positive HIV status (either from the ANC or tested at admission for delivery), willingness to participate, able to give informed written or fingerprint consent and being resident in Mwanza City for at least four months post delivery. Birth outcome was not considered as an inclusion or exclusion factor because mothers whose infants had a poor birth outcome, such as stillbirth, may be, for example, vulnerable to falling out of HIV care and treatment programmes.

4.7.2 Cohort recruitment

The cross-sectional study took place during the first months of the cohort recruitment. During this period, all women admitted for delivery were given the information about the study in the maternity ward while at their beds, and thereafter they were called one by one in a private room where they were given written information about the study and asked to sign a consent form. During this first month, all HIV-positive women were first seen by the counsellor who informed them about the study and if they agreed to participate, the counsellor then introduced them to a research assistant. A woman was then given verbal and written information about the cohort study and was asked to participate. Those who agreed were asked to sign or fingerprint a consent form. Women who did not fulfil the inclusion criteria were asked to participate in the cross-sectional study. After the cross-sectional study, HIV-positive women were seen by the counsellor who introduced them to a research assistant after informing them about the study. The information about the study was given to individual women in a private room, and the procedure explained was followed.

After informed consent, a research assistant (trained clinical officer/nurse midwife) based at each delivery site administered a structured questionnaire to the women so as to gather information on socio-demographic characteristics, parity, gravidity, outcomes of previous pregnancies and past contraceptive use. Data were also collected about the current pregnancy including where they attended the antenatal care, whether they were screened for syphilis, whether they had access to PMTCT services at the ANC/RCH, and were tested. For those not screened during

pregnancy at ANC/RCH clinic, data were collected on potential reasons they were not screened at that time.

For women who were tested during pregnancy and found to be HIV infected, data were collected on which PMTCT drug(s) were given, whether the mother took her ARV prophylaxis appropriately, whether she had an HIV assessment at a CTC during that pregnancy, details on her CD4 counts if available and whether she was started on HAART. Other information collected included knowledge about syphilis, MTCT and PMTCT, where the women intended to attend for under-five services and tracing information for women who agreed to have home visits.

According to the Tanzania national guidelines on management of sexually transmitted and reproductive tract infections [106], pregnant women not screened for syphilis during pregnancy at ANC should be screened at the maternity ward. The research team observed that this was not happening at the two study maternity wards, and for ethical reasons, we organised for a blood sample to be collected for syphilis screening from women in the cohort who had not been screened and treated for syphilis during pregnancy. These samples were sent to Makongoro clinic for a rapid plasma reagin (RPR) test. Women who found to be RPR positive on this test were traced at home by the research team and were taken to Makongoro clinic with their infants for syphilis treatment as soon as possible. At Makongoro clinic mothers were treated with benzathine penicillin 2.4 mu IM single dose and their infants were treated with single dose of benzathine penicillin 50,000 iu/kg according to the Tanzanian guidelines [106]. Efforts were also made to treat their husbands/partners.

After delivery and before the mother was discharged from the hospital, data were collected on the delivery mode, outcome of the pregnancy, sex of the infant and whether the infant received ARV prophylaxis after births and which drug(s) were given, what counselling was given about infant feeding, what method of feeding the mother had chosen and whether the mother was counselled on family planning. The Study Identification Card was provided to all enrolled women to bring to the under-five RCH clinics during the follow up.

For mothers who had opted for replacement feeding, no data were collected to evaluate the AFASS criteria. Traditionally, in the maternity wards in Tanzania, soon after delivery, women are

encouraged to put the baby to the breast to stimulate the breast-milk and they do not give any oral solution (e.g. glucose) to the infants in the maternity ward. During this study we observed that apart from the medicine syrup (mainly ARV syrup that was administered to HIV exposed infants (HEI)), there was no oral glucose or any liquid given to infants in the maternity ward with the exceptional of few HIV exposed infants whose mothers had opted for replacement feeding and who started feeding their infants before discharge from the hospital.

4.7.3 Cohort follow-up

All women recruited into the prospective cohort were followed up post-delivery at their monthly under-five RCH clinic visits for four months. At each visit standardized questionnaires was administered by research assistants (clinical officers and nurse midwife) to collect data on infant feeding, uptake of infant HIV testing post-delivery, progress of the mother at the CTC clinic, family planning (FP) counselling and uptake, disclosure of HIV status to partner and other relatives and information on sexual behaviour.

Women who failed to attend the under-five RCH clinic visits were followed up at home to administer the same questionnaire and to record reasons for non-attendance to the under-five RCH clinic.

During these follow up visits, HIV-positive mothers who had not attended a CTC were asked several extra questions to explore reasons for non-attendance to a CTC. They were then re-referred to the counsellor at the RCH clinics to explain why assessment of their own health was important and to encourage them to attend the nearest CTC.

Figure 4-4 Home visit

Source: Field data

4.8 Sample size available, estimated power and probable precision for the major study outcomes

4.8.1 Cross-sectional study at BMC and STRH maternity wards

A structured questionnaire was administered to women admitted for delivery at BMC and STRH for a period of one month. The average number of deliveries per day was estimated to be 30 and 15 at STRH and BMC respectively. To calculate the number of women who were expected to be interviewed at the maternity wards, the following assumptions were made:

1. Interviews were to be conducted from Monday to Friday (i.e. 22 days)
2. Refusal rate was estimated to be 10%

With these assumptions, it was envisaged that 990 women were to be admitted for delivery at both maternity wards during the study period of one month (22 working days) of which 900 women would be interviewed. Table 4-4 shows the estimated power and probable precision that would be obtained for different estimates of the three main outcomes from a sample size of 900 women. The three outcomes are:

1. Percentage of pregnant women delivering at BMC & STRH who were tested for HIV during ANC
2. Percentage of pregnant women delivering at BMC & STRH who were screened and treated for syphilis during ANC
3. Percentage of pregnant women delivering at BMC & STRH who were tested for HIV & syphilis during ANC

Table 4-4 **Estimated power and probable precision for the main outcomes, with a given sample size of 900 women**

Outcome	%	Precision	Power
Pregnant women admitted for delivery who were tested for HIV during ANC	20%	± 3.9%	80%
	30%	± 4.2%	80%
	40%	± 4.5%	80%
Pregnant women admitted for delivery who were screened and treated for syphilis during ANC	50%	± 4.7%	80%
	60%	± 4.6%	80%
	70%	± 4.4%	80%
Pregnant women screened for both HIV and syphilis during ANC	20%	± 3.9%	80%
	30%	± 4.2%	80%
	40%	± 4.5%	80%

4.8.2 Prospective cohort at BMC and STRH maternity wards.

The prospective cohort at BMC and STRH was recruited over a period of five months.. To estimate the number of HIV-positive women who could be recruited over the five months, the following assumptions were made

1. HIV prevalence on admission to delivery (includes women tested at ANC/RCH and those tested during admission for delivery):-
    a. 10% at STRH maternity ward from an average of 30 women per day
    b. 7% at BMC maternity ward from an average of 15 women per day

From these estimates, an average of 4 HIV-positive women were estimated to deliver at the two sites each day giving a total of 440 HIV-positive women admitted for delivery over a five months period.

2. Approximately 10% of HIV-positive women were expected not to meet the inclusion criteria
3. The refusal rate at cohort recruitment was estimated to be 10%.
4. Loss to follow-up during the 4 months study period would be about 20%.

Therefore, 264 women were expected to complete the 4 months follow up after delivery. Table 4-5 shows the estimated power and probable precision that would be obtained for different estimates of the 3 main outcomes from a sample size of 264 women who were expected to be seen 4 months after delivery. These outcomes include:

1. The percentage of HIV-positive women who were referred to CTC and attend;
2. The percentage of HIV-positive women counselled on infant feeding options before discharge from the hospital;
3. The percentage of HIV-positive women following their planned feeding regimen.

Table 4-5 Estimated precision for the main outcomes, with a given sample size of 264 women

Outcome	%	Precision	Power
HIV-positive women referred and attend CTC	40%	± 8.1%	80%
	50%	± 8.5%	80%
	60%	± 8.6%	80%
	70%	± 8.3%	80%
HIV-positive women counselled on infant feeding option before discharge from the hospital	60%	± 8.6%	80%
	70%	± 8.3%	80%
	80%	± 7.5%	80%
	90%	± 6.0%	80%
HIV-positive women adhering to their planned feeding regimen	40%	± 8.1%	80%
	50%	± 8.5%	80%
	60%	± 8.6%	80%

4.9 Data management

Research assistants, crosschecked all questionnaires for completeness on a daily basis. Questionnaires were then submitted to the data entry section and double-entered into Epidata Entry 3.1 (The Epidata Association" Odense, Denmark) and cleaned and analysed using Stata 9.0 and Stata 11.0 (STATA Corporation, Texas, USA) software respectively.

Data from the cross-sectional and cohort studies were used to determine the proportion of women who successfully completed the PMTCT and maternal syphilis interventions. A Piot-Fransen Model was used that describes the percentage of women that complete the different steps they have to pass through as part of the specific intervention activities in order to prevent the transmission of HIV and congenital syphilis to their infants [113]. By analyzing this model it was possible to identify the gaps in the delivery of services focusing on prevention of HIV and syphilis to the infants during and after pregnancy. The fall-off at each step of the different PMTCT and maternal syphilis interventions was calculated using the denominator of women who successfully completed the previous step. Finally, the overall fall off from beginning to end of the intervention steps was calculated.

To identify potential client and provider factors that are likely to influence women's successfully completion of PMTCT and maternal syphilis screening and treatment programmes, crude odds ratios with 95% CI were estimated using logistic regression analysis of the facility level factors. Factors whose univariable association with the outcome (e.g. acceptance of HIV testing or syphilis screening or completion of PMTCT interventions) reaches statistical significance at $p<0.1$ were included in an initial multivariate model and retained if significant at $p<0.1$. Individual level factors were added to the module (adjusted for the core set of facility level factors). Factors with the likelihood ratio test (LRT) $p<0.1$ in the final model were retained.

4.10 Ethical considerations

4.10.1 Ethical approval

Ethical approval was given by the LSHTM ethics Committee and the Medical Research Coordinating Committee (MRCC) in Dar es Salaam, Tanzania on 8th July 2008 and 1st July 2008 respectively (Annex 2 and Annex 3).

4.10.2 Informed consent

Written informed consent (Annex 4) was sought from each pregnant woman participating into the cross-sectional study and the cohort study at the maternity wards. All participants were informed that participation in the study was voluntary and that they could withdraw from the study at anytime. They were also informed that participants who did not wish to participate would continue to be offered the routine antenatal and delivery services. For HIV-positive women who participated in the cohort study, a special request for home visit was made so that follow up could continue if the women failed to be seen at the under-five clinics and only those who agreed for home visits were visited and interviewed at home. This agreement was part of the written consent (Annex 4) and it was documented on the tracing forms (Annex 8).

4.10.3 Confidentiality

Codes rather than names were used in all forms with sensitive information. Personal names were used only for tracing information and this was linked to other information by the principal researcher when required. Privacy was maintained all the time during the interviews with HIV-positive women, interview rooms were locked during the interview and no person was allowed to enter into these room during the interviews.

4.10.4 Dissemination

Dissemination meetings will be held with the Municipal Health Management team and PMTCT stakeholders to inform them of the results of the study in late 2010 or early 2011.

CHAPTER 5: COMPLETION OF PMTCT AND MATERNAL SYPHILIS SCREENING AND TREATMENT PROGRAMMES AMONG PREGNANT WOMEN

5.1 Introduction

This chapter examines the proportion of pregnant women who successfully complete different steps of prevention of mother-to-child transmission of HIV (PMTCT) interventions and maternal syphilis screening and treatment. Data to address this aim were collected from several studies that were conducted at three antenatal care (ANC) facilities and two maternity wards and among pregnant women attending those health facilities in Mwanza City between 2008 and 2009. These studies are briefly explained below.

5.1.1 Record review

A review of the record books at Makongoro, Nyamagana and Igoma Reproductive and Child Health (RCH) clinics[1], and at Sekou-Toure Regional Hospital (STRH) and Bugando Medical Centre (BMC) maternity wards was conducted in order to assess the utilization of PMTCT and syphilis screening and treatment services. The records contained information on service utilization at the health facilities and the review focused on the period between 1st September 2007 and 31st August 2008.

5.1.2 Cross-sectional study

A cross-sectional study at STRH and BMC maternity wards in Mwanza city was conducted to collect data on PMTCT and syphilis screening services offered during the current pregnancy amongst women being admitted for delivery. This study provided data on i) the proportion of pregnant women who were tested for HIV and syphilis either at the ANC or at the labour ward when they were admitted for delivery, ii) the proportion of women who were RPR positive and who were treated for syphilis before delivery, and iii) the proportion of infants born to RPR positive women who received treatment after birth but prior to discharge from the hospital.

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[1] At the RCH clinics we reviewed the ANC record books that document information on women attending the facilities for antenatal care

[2] On a register book there was a column that indicated the treatment date

[3] For the cross-sectional study tracing information were not collected therefore it was not possible to trace the

5.1.3 Cohort study

Data from a prospective cohort of 403 HIV-positive women enrolled on admission for delivery at STRH and BMC maternity wards in Mwanza city who were tested for HIV either before pregnancy, during pregnancy at the ANC or at the maternity ward when they were admitted for delivery before or after delivery was used to estimate the proportion of HIV-positive women completing different steps of PMTCT interventions regardless of when they were tested and found to be HIV-positive.

5.1.4 Piot-Fransen models

Using the cross-sectional data and the cohort data described above, a Piot- Fransen model was built up to show the fall-off at each step of the PMTCT using the denominator of women who successful completed the previous step and then the overall fall out at each step was calculated using the denominator of all women eligible for that particular service. Similarly, using the cross-sectional data, a Piot-Fransen model was built to show the fall off at each step in syphilis screening and treatment services during pregnancy.

5.2 Record review

Reviews were conducted at the ANC facilities and the maternity ward. Data on service utilization over a period of one year between 1st September 2007 and 31st August 2008 were collected

5.2.1 Record review at the ANC facilities

A total of 8141 pregnant women attended ANC for the first time during the current pregnancy i.e. 3546 women were seen at Makongoro, 2658 women at Nyamagana and 1937 women at Igoma RCH clinics between 1st September 2007 and 31st August 2008.

5.2.1.1 *PMTCT service utilization at ANC*

Table 5-1 shows the number and proportion of women attending at each of the three facilities and the proportion that received different PMTCT interventions. The record review indicated that 10,044 pregnant women were offered PMTCT HIV pre-test counselling over a period of one year while the number attended the ANC for the first time during the current pregnancy was 8141. This was due to the fact that women attending ANC facilities that do not offer PMTCT services in Mwanza city are referred to the nearest ANC that offers PMTCT services. These women were

included in the PMTCT record books along with women who attended the ANC for the first time at the facility. The records however, did not indicate which women were referred to three facilities from clinics, which do not offer PMTCT services. For this reason, using the record review data it was not possible to estimate the proportion of women attending ANC for the first time during the current pregnancy who were not offered PMTCT interventions.

Overall, 9793 (97.5%) of pregnant women who received HIV pre-test counselling accepted the PMTCT HIV testing and of these, 809 (8.3%) were HIV-positive. Among the HIV-positive women, 405 (50.1%) were given ARV for PMTCT at the ANC clinic. The proportion of HIV-positive women receiving ARV for PMTCT at ANC differed significantly between the three ANC facilities.

In addition review of data on HIV testing among partners of pregnant women who were tested for HIV during the current pregnancy was done. It was found that only 83 (0.8%) of the partners were tested for HIV at these ANC facilities and 19 (22.9%) of the partners were found to be HIV-positive.

Table 5-1 PMTCT service utilization at ANC between 1st September 2007 and 31st August 2008

	Makongoro	Nyamagana	Igoma	Total
Number of women attending ANC for the 1st time during current pregnancy	3546	2658	1937	8141
Number of pregnant women offered PMTCT HIV pre test	4918	4143	983	10044
Number and proportion of pregnant women accept PMTCT HIV test[1]	4916 (99.9%)	3894 (94.0%)	983 (100%)	9793 (97.5%)
Number and proportion of pregnant women test HIV-positive[2]	368 (7.5%)	346 (8.9%)	95 (9.6%)	809 (8.3%)
Number of HIV-positive women given ARV for PMTCT in ANC[3]	138 (37.5%)	264 (76.3%)	3 (3.2%)	405 (50.1%)
Number and proportion of partners tested for HIV[4]	45 (0.9%)	32 (0.8%)	6 (0.6%)	83 (0.8%)
Number and proportion of partners who tested HIV-positive[5]	7 (15.6%)	11 (34.4%)	1 (16.7%)	19 (22.9%)

[1] Denominator is all women offered PMTCT HIV counselling
[2] Denominator is the number of women who were tested
[3] Denominator is the number of women who tested HIV positive
[4] Denominator is the number of women who were tested for HIV
[5] Denominator is the number of partners who were tested for HIV

5.2.1.2 *Syphilis screening and treatment at ANC*

Table 5-2 shows the number of women who attended each facility and the number and proportion of those who were screened for syphilis during pregnancy and, if RPR positive, those who were treated for syphilis. As for HIV counselling and testing also for syphilis screening, women are referred from other facilities that do not offer syphilis screening and therefore it was not possible to determine what proportion of women attending ANC for the first time during the current pregnancy were not screened for syphilis. From the record review, it was found that majority of the women who were RPR positive were not given treatment on the same day though results were given on the same day[2]. Reasons for this included the fact that most of the time the medicine is not available at the ANC clinic. In such cases, women were given a prescription and they were asked to buy the medicine (injectable penicillin) from their local pharmacies and bring it to the clinic to be administered by qualified health personnel. In most cases, according to the STD nurse at Igoma health centre, this takes on average 3 to 7 days, with few of them bringing the medicine during the next ANC visit. It was also learnt at Nyamagana Clinic that RPR positive women were asked to bring their partners so that both could be treated.

In total, 8169 pregnant women were screened for syphilis, of these 538 (6.6%) were RPR positive. Of the RPR positive women, 191 (35.3%) were treated and only 79 (14.7%) partners of the pregnant women who were RPR positive were treated.

Table 5-2 Syphilis screening and treatment at ANC between 1st September 2007 and 31st August 2008

	Makongoro	Nyamagana	Igoma	Total
Number of women attending ANC for the 1st time during current pregnancy	3546	2658	1937	8141
Number of women screened for syphilis	3338	3006	1825	8169
RPR positive	186 (5.6%)	210 (7.0%)	142 (7.8%)	538 (6.6%)
RPR positive and treated	76 (40.9%)	67(31.9%)	48 (33.8%)	191 (35.5%)
RPR positive and partner treated	41 (22.0%)	33 (15.7%)	5 (3.5%)	79(14.7%)

[2] On a register book there was a column that indicated the treatment date

5.2.2 Record review at the maternity ward

In total 14923 women delivered at BMC and STRH maternity wards between 1st September 2007 and 31st August 2008. Of these 7212 (48.3%) had tested for HIV at the ANC, 4067 (27.2%) were tested for HIV at the maternity ward before or after delivery and 3644 (24.4%) left the maternity ward with unknown HIV status. Table 5-3 shows the number and proportion of women admitted for delivery at BMC and STRH and their HIV status at admission and at discharge from the maternity ward after delivery.

There was no difference between the proportions of women tested for HIV at the maternity wards at BMC and STRH (28.8% vs. 26.1%). However, there was a higher proportion of women who delivered at BMC with known HIV status from the ANC compared to those who delivered at STRH (58.6% vs. 40.7%). Following the findings above, it was found that a higher proportion of women delivering at STRH left the maternity ward with unknown HIV status compared to those who delivered at BMC (33.1% vs. 12.6%). HIV prevalence in the maternity wards was slightly lower at both maternity wards when compared to the HIV prevalence at ANC. This might be due to the fact that some of the women who deliver at both STRH and BMC maternity wards originate from rural areas where HIV prevalence might be lower compared to the HIV prevalence in Mwanza city.

Table 5-3 HIV prevalence and timing of HIV testing among women delivering at BMC and STRH between 1st September 2007 and 31st August 2008

	BMC	STRH	Total
Total delivered	6332	8591	14923
Tested at ANC	3713 (58.6%)	3499 (40.7%)	7212 (48.3%)
Tested at the maternity ward	1822 (28.8%)	2245 (26.1%)	4067 (27.2%)
Left the maternity ward with unknown HIV status	797 (12.6%)	2847 (33.1%)	3644 (24.4%)
		HIV-positive	
Tested HIV-positive at ANC	276 (7.4%)	256 (7.3%)	532 (7.4%)
Tested HIV-positive at the maternity ward	82 (4.5%)	135 (6.0%)	217 (5.3%)
Total known HIV-positive before discharge from the maternity ward	358 (6.5%)	391 (6.8%)	749 (6.6%)

5.3 *Cross-sectional study at the maternity ward*

A cross-sectional study was conducted among pregnant women admitted for delivery at BMC and STRH to collect data on PMTCT and maternal syphilis screening services offered during the current pregnancy.

Of the 1435 women admitted for delivery at BMC and STRH maternity wards between 8th September and 12th October 2008, 1157 (80.6%) women were interviewed. Two hundred and seventy eight (19.4%) pregnant women admitted for delivery during the study period left the hospital without being interviewed, mainly because the researchers worked during routine hours and were not able to see women discharged early in the morning. Twenty women who were interviewed did not have their ANC cards and therefore were excluded from the analysis for this section.

5.3.1 Proportion of pregnant women tested for HIV

In total, 1137 women who had their ANC card at delivery were included in this analysis. Table 5-4 shows the number and proportion of women with documented HIV results and their reported PMTCT interventions at ANC. Overall, 915 (80.1%) women reported receiving PMTCT HIV pre-test counselling at the ANC, of whom 826 (80.5%) had a documented HIV test result on their ANC cards. In total 903 (79.4%) had a documented HIV result including 77 (8.5%) who reported not receiving PMTCT HIV pre-test counselling. Of the 903 women who were tested, 877 (97.1%) reported receiving individual HIV post-test counselling of whom 71 (8.1%) had a positive HIV test result. There was no difference in proportion of women receiving various PMTCT interventions between women admitted for delivery at BMC and those admitted at STRH.

Table 5-4 PMTCT HIV testing among pregnant women admitted for delivery at STRH and BMC between September and October 2008

HIV counselling and testing at ANC or at the maternity ward			
Variable	**STRH n (%)**	**BMC n (%)**	**Total**
Number of women interviewed (ANC cards presented on maternity ward)	711 (99.4)	426 (96.4)	1137 (98.3)
PMTCT HIV pre-test counselling received	564 (79.3)	351 (82.4)	915 (80.5)
Documented HIV test results in ANC card	573 (80.6)	330 (77.5)	903 (79.4)
Documented HIV results in ANC card and received HIV pre-test counselling	311 (88.6)	515 (91.3)	826 (72.6)
Documented HIV results in ANC card and received PMTCT HIV post-test counselling	325 (86.0)	552 (91.1)	877 (89.1)
HIV-positive result in ANC card	43 (7.8)	28 (8.6)	71 (8.1)

5.3.2 Proportion of pregnant women screened and treated for syphilis at ANC

Of 1137 women who had their ANC card at delivery, 1002 (88.1%) had a documented syphilis screening result. Of these, 59 (5.9%) women were RPR positive of whom 43 (78.9%) had been treated for syphilis at the ANC facility with a single dose benzathine penicillin 2.4 m.u IM. All 59 RPR positive women had live births, but none of the infants born to RPR positive women were treated before their discharge from the hospital[3] despite treatment being a recommendation in national guidelines [106].

Table 5-5 shows the number and proportion of women admitted for delivery at BMC and STRH between 8th September and 12th October 2008 who were screened for syphilis during pregnancy, those who were RPR positive, and the number and proportion of those who were treated. There was no difference in the proportion of women who were screened for syphilis during pregnancy between the two maternity wards (87.8% vs. 88.7% at STRH and BMC respectively). However, there was a difference in the proportion of women who were treated for syphilis (65.8% vs. 85.7%) respectively. This could be explained by the nature of the two hospitals. A proportion of women admitted at BMC for delivery are those who have various complication that needed care

[3] For the cross-sectional study tracing information were not collected therefore it was not possible to trace the mother/infants after discharge from the hospital for syphilis treatment at the RCH clinic.

at a referral hospital and hence more likely to have had multiple visits to the health facilities during pregnancy and therefore a higher chance of being treated.

Table 5-5 Maternal syphilis screening and treatment among pregnant women admitted for delivery at STRH and BMC between September and October 2008

Variable	STRH n (%)	BMC n (%)	Total n (%)
Number of women interviewed (ANC cards presented on maternity ward)	711 (99.4)	426 (96.4)	1137 (98.3)
Tested for syphilis at ANC	624 (87.8)	378 (88.7)	1002 (88.1)
RPR positive	38 (4.3)	21 (4.9)	59 (5.9)
RPR positive and given treatment during pregnancy	25 (65.8)	18 (85.7)	43 (72.9)

5.4 Cohort study

Overall, 442 HIV-positive women were admitted for delivery at the two study maternity wards for a five month period from 8th September 2008 to 20th February 2009. One hundred and ninety three women (43.7%) were admitted at BMC and 249 (56.3%) were admitted at STRH. Of the 442 HIV-positive pregnant women delivering at the two sites, 403 (91.2%) were recruited into the cohort study. Table 5-6 shows the number of HIV-positive women who delivered at BMC and STRH between September 2008 and February 2009 and the number and proportion recruited in the study, with the reasons for not being included in the cohort.

Equal proportions of HIV-positive women who delivered at both BMC and STRH were recruited in the cohort. Twenty-seven women out of 39 (69.2%) who were not recruited in the study were living outside Mwanza city and majority of these were admitted for delivery at STRH. Only 2 women were not able to sign the consent form

Table 5-6 HIV-positive pregnant women delivering at BMC and STRH during the cohort recruitment

Site	BMC n (%)	STRH n (%)	Total n (%)
Total number delivered	193 (43.7)	249 (56.3)	442 (100.0)
Recruited in the study	176 (91.2)	227 (91.2)	403 (91.2)
Total not recruited	**17**	**22**	**39**
Reason for not being recruited			
Refused	4 (23.7)	2 (9.1)	6 (15.4)
Living outside Mwanza City	9 (52.9)	18 (81.8)	27 (69.2)
Not able to sign the consent form	1 (5.9)	1 (4.5)	2 (5.1)
Not seen by the team	3 (17.7)	1 (4.5)	4 (10.3)

5.4.1 Timing for the HIV test among the HIV-positive women participated in the cohort study

Of the 403 women in the cohort, 93 (23.1%) women were tested for HIV before the current pregnancy, 240 (59.5%) were tested at ANC facility during the current pregnancy, 23 (5.7%) were tested at the maternity ward before delivery and 47 (11.7%) were tested at the maternity ward after delivery. Of the 93 women testing HIV-positive before the current pregnancy, 24 (25.8%) did not have a repeat HIV test when they attended the ANC facility for the current pregnancy. All stated that this was because they had tested before and they knew their HIV status, though this is contrary to the National PMTCT guidelines[37]. Table 5-7 shows the timing of HIV test among HIV-positive women who participated in the cohort study

Table 5-7 Timing for HIV testing among HIV-positive women in the cohort

Timing of the HIV test		BMC n (%)	STRH n (%)	Total n (%)
Total		178 (44.2)	225 (55.8)	403 (100.0)
Before the current pregnancy		54 (30.3)	39 (17.3)	93 (23.1)
At ANC during the current pregnancy		96 (53.9)	144 (64.0)	240 (59.5)
At the maternity ward	Before delivery	11 (6.2)	12 (5.3)	23 (5.7)
	After delivery	17 (9.6)	30 (13.4)	47 (11.7)

A slightly higher proportion of women who tested for HIV before the current pregnancy were admitted for delivery at BMC compared to STRH. Thirty women out of forty-seven women (63.8%) who were tested for HIV after delivery were admitted and delivered at STRH.

5.4.2 PMTCT ARV prophylaxis use among HIV-positive women participated in the cohort study.

To estimate the proportion of HIV-positive women who were given ARV for PMTCT, women were divided into two categories. The first group included women who had attended an adult care and treatment clinic (CTC) and brought their CTC cards on admission to delivery at the maternity ward. The second group included those who reported receiving any ARV for PMTCT.

5.4.2.1 *PMTCT ARV prophylaxis as indicated on CTC cards*

Of the 403 women in the cohort, 84 (20.8%) attended a CTC before delivery and had brought their CTC cards on admission for delivery. This card (Annex 5) records their HIV treatment. Of these 84 women, 38 (45.2%) women were on HAART, 11 (13.1%) had been given AZT 300 mg twice a day (BD) starting at 28 weeks gestation or soon after being tested if the test was done after 28 weeks gestation. Thirty-one women (36.9%) were given sdNVP. For four women (4.8%), there was no documented ARV medication or prophylaxis that was indicated on the CTC cards. However, two of these four women reported to have used some medication for PMTCT and two said that they were not given any medication for PMTCT. Two women attending a CTC before delivery did not get any ARV for PMTCT either from the CTC clinic or the ANC facility or from the maternity ward when they were admitted for delivery.

5.4.2.2 *PMTCT ARV prophylaxis as reported by the pregnant women*

For the remaining 319 women who did not have a CTC card at the maternity suite, 85 (21.1%) of 403 women in the cohort reported attending the CTC but did not bring the CTC card, 164 (40.7%) out of 403 stated that they did not attend a CTC before delivery and 70 (17.4%) had tested for HIV at the maternity ward, therefore it was not possible for them to have attended a CTC before delivery.

When asked if they were given medication for PMTCT to use during pregnancy 188 (58.9%) reported receiving some ARV to use for PMTCT, 81 (25.4%) reported they were not provided with

PMTCT ARV medication, three (0.9%) women reported that they did not know whether or not they were given any ARV for PMTCT and 47 (14.7%) women were tested for HIV after delivery and therefore they were not eligible for any ARV medication for PMTCT according to the PMTCT guidelines [37], explained in Table 2-1.

5.4.2.3 *PMTCT ARV prophylaxis documented and reported*

In total 270 (75.8%) women who were eligible (i.e. those women who were tested before delivery) for ARV for PMTCT were actually given ARV for PMTCT. Table 5-8 shows the overall number and proportion of HIV-positive women given any ARV for PMTCT stratified by different timing of HIV test and the delivery suites. Eight-one out of 93 (87.1%) of women who tested for HIV before the current pregnancy received PMTCT ARV prophylaxis compared to 177 out of 240 (73.7%) who were tested for HIV during the current pregnancy at ANC facility and 12 out of 23 (52.2%) who were tested at the maternity ward. Overall, there were a low proportion of women who were tested for HIV at delivery who received ARV for PMTCT and this proportion was slightly different between the two maternity wards (45.5% vs. 58.3% at BMC and STRH respectively).

Table 5-8 HIV-positive women given ARV medication for PMTCT by timing of the HIV test

	Given any ARV for PMTCT		
Timing for HIV test	BMC n (%)	STRH n (%)	Total n (%)
Total	127(78.9)	143 (73.3)	270 (75.8)
Before the current pregnancy	48 (88.9)	33 (84.6)	81 (87.1)
At ANC during current pregnancy	74 (77.1)	103 (71.5)	177 (73.7)
At the maternity ward before delivery	5 (45.5)	7 (58.3)	12 (52.2)

5.4.2.4 *Use of PMTCT ARV prophylaxis among HIV-positive women*

All 270 women who had been given ARV during pregnancy were asked if they actually used the medication when it was supposed to be used. Ten (3.7%) women (four at BMC and six at STRH), who were all given sdNVP to be used at the onset of labour, reported that they did not use the medication. When asked why, five (50%) reported that they had left the medication at home, two

(20%) reported that they had swallowed the tablet when they felt unwell but before true labour, two (20%) reported that they had the medication but they did not remember to take the medication during real onset labour and one woman reported that she was told by a doctor at BMC not to swallow the tablets since she was going to have a caesarean section.

5.4.3 PMTCT ARV prophylaxis use among HIV-exposed Infants (HEI) in the study

All 403 cohort participants were interviewed after delivery, the majority (81.1%) within two to ten hours after delivery. Women who delivered by caesarean section or who had other complications were interviewed as soon as they were able to sit on a chair for at least one hour. Seventeen (4.2%) women had stillbirths and were therefore excluded from the analysis of ART prophylaxis to the infant. All HIV-exposed infants, according to the National PMTCT guidelines [37] are supposed to be given ARV for PMTCT as soon as the infant could tolerate oral feedings and within 12 hrs after delivery

5.4.3.1 *Reported PMTCT ARV prophylaxis use among HEI at cohort recruitment*

Of the 386 women who had live births, 250 (64.8%) reported that their infants were given ARV for PMTCT and 136 (35.2%) reported that their infants had not been given ARV for PMTCT at the time of the interview, two to ten hours after delivery for the majority (women who had no complications during or after delivery).

When asked why the infant had not received ARV, 115 (84.6%) of the 136 women indicated that were still admitted and had not been seen by the PMTCT counsellor responsible for prescribing ARV medication for HIV-exposed infants (HEI). Three (2.2%) had infants who died before they could be given ARV for PMTCT (two were premature), four (2.9%) infants were reported to have been ill, one woman refused her infant to be given ARV medication, three (2.2%) women left the hospital before they were seen by the PMTCT counsellor, one woman at STRH reported that she was told that infant ARV for PMTCT was out of stock and nine (6.6%) women said that they did not know why the infants were not given ARV.

5.4.3.2 *Reported PMTCT ARV prophylaxis use among HEI at month one follow up visit*

Women were followed monthly for four months post delivery. At the first month follow up, 360 (89.3%) women were seen and were asked if their infants were given any ARV medication for

PMTCT after birth but before discharge from the hospital. This was basically to correct information from those whose infants were not yet given ARV for PMTCT during the cohort recruitment. Overall, 295 (81.9%) of women who were seen reported that their infant were given ARV for PMTCT before discharge from the hospital after delivery. Of the 115 women whose infants did not receive ARV for PMTCT during the cohort recruitment interview, 102 (88.7%) were seen at the first month post delivery follow up.

Of 102 women who were seen, 65 (63.7%) women reported that their infants were given ARV for PMTCT including two women who previously reported that their infants were sick and therefore did not get ARV. One of nine women who had previously reported that they did not know why their infants were not given ARV for PMTCT, at the first month follow up visit post delivery reported that the infant was actually given ARV for PMTCT before discharge from the hospital.

5.4.3.3 *Use of PMTCT ARV prophylaxis among HEI*

Combining the information obtained from the women at the first month follow up visit with the information collected at the time of the cohort recruitment it was found that, in total, 318 (83.0%) women reported that their infants were given ARV for PMTCT before discharge from the hospital. Table 5-9 shows the overall number of HEI who received ARV for PMTCT at each delivery site and the type of ARV regimen that were received.

Table 5-9 HIV-exposed Infants who received ARV prophylaxis for PMTCT at birth and type of ARV given

	BMC n (%)	STRH n (%)	Total n (%)
Total HEI received any type of ARV for PMTCT	152 (89.4)	166 (77.9)	318 (83.0)
sdNVP 2mg/kg only	33 (21.7)	56 (33.7)	89 (28.0)
sdNVP 2mg/kg + AZT 4mg/kg BD for 1 week	22 (14.5)	15 (9.1)	37 (11.6)
sdNVP 2 mg/kg + AZT 4mg/kg BD for 4 weeks	97 (63.8)	95 (57.2)	192 (60.4)

One hundred and ninety two (60.4%) of HEI who received PMTCT ARV prophylaxis were given a longer combined regimen. sdNVP was prescribed to a higher proportion of HEI at STRH compared to those at BMC (33.7% vs. 21.7%).

5.4.4 Infant feeding counselling

Data were collected at the maternity ward on infant feeding counselling and planned infant feeding choice and, at the post delivery follow up visits; information on the actual infant feeding choice was collected. Among the 403 cohort members, 20 women were not eligible for the infant feeding counselling either because they had stillbirths (n=17) or their infants died before discharge from hospital (n=3). Of the 383 remaining women, 281 (73.4%) reported receiving counselling on infant feeding methods at the maternity ward from the PMTCT counsellor.

5.4.4.1 *Infant feeding choices at delivery*

At cohort recruitment, women were asked which infant feeding method they were intending to follow regardless of whether they were counselled or not at the maternity ward. Of the 383 women, 306 (79.9%) reported that they were intending to exclusively breastfeed (EBF) for at least four months, 29 (7.6%) reported that they had decided to use replacement feeding (RF), and 49 (12.5%) reported that they had not yet decided on the infant feeding method. Table 5-10 shows the infant feeding choices among the women who participated in the cohort study stratified by whether women were counselled or not.

Table 5-10 Infant feeding methods selected by HIV-positive women who were either counselled or not counselled on infant feeding at delivery

		BMC Counselled		STRH Counselled		Total Counselled	
		Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
	Total	135 (79.4)	35 (20.6)	146 (68.5)	67 (31.5)	281 (73.4)	102(26.6)
Method selected	Exclusive breast feeding for at least 4 months	119 (88.2)	25 (71.5)	133 (91.1)	29 (43.3)	252 (89.7)	54 (52.9)
	Replacement feeding	15 (11.1)	4 (11.4)	7 (4.8)	3 (4.5)	22 (7.8)	7 (6.9)
	Not yet selected	1 (0.7)	6 (17.1)	6 (4.1)	35 (52.2)	7 (2.5)	41 (40.2)

Overall, 281 (73.4%) of 383 women received counselling on infant feeding options and 102(26.6%) of 383 women did not receive counselling on infant feeding option. Of the 281 women who were counselled on infant feeding option 252 (89.7%) women opted for EBF, 22 (7.8%) women opted for RF and 7 (2.5%) had not decided on the infant feeding option at cohort recruitment. A significantly higher proportion of women who received counselling on infant feeding option opted for EBF compared to those who did not receive counselling on infant feeding options (89.7% vs. 52.9%, $p<0.001$). Similarly, a significantly higher proportion of women who did not receive counselling on infant feeding option had not decided on the infant feeding method at cohort recruitment compared to women who were counselled on infant feeding options (40.2% vs. 2.5%; $p<0.001$) . There was some difference in the proportion of women counselled on infant feeding between the two hospitals. A higher proportion of women who delivered at STRH did not receive infant feeding counselling compared to women who delivered at BMC (31.5% vs.20.6%, p=0.017).

5.4.4.2 *Reported infant feeding practices one month after delivery*

During the first month follow up visit, 361 of 403 (89.6%) women were seen. Of these, one woman was very sick and therefore she was not interviewed. Of the 360 women who were interviewed, 15 (4.2%) included women who had stillbirths and whose infants died before discharge from hospital. A further six (1.7%) women had lost their babies within the first month after birth. These 21 women were excluded from the analysis of infant feeding choice at month 1 follow up visit. Of the 339 remaining women, 302 (89.1%) reported EBF, 23 (6.8%) reported using RF (mainly cow's milk and porridge) and 14 (4.1) reported to have used mixed feeding (MF).

When they were asked about anything else that they were giving to their infants, four of 302 women who reported EBF also reported giving the infant water and traditional medicine, 20 reported giving traditional medicine and 19 reported giving water in addition to breast milk. If the definitions of the infant feeding methods according to the PMTCT guidelines (see Box 5-1) are applied, then the number of women who were EBF at the first month follow up visit was therefore 259 (76.4%) and the number of women who were practising mixed feeding was 57 (16.8%).

Box 5-1: Definition of the infant feeding methods

Exclusive breastfeeding (EBF): Feeding infant *ONLY* breast milk and no other liquids or solids, with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines prescribed by a healthcare worker.

Replacement feeding (RF): Feeding infant something *OTHER THAN* breast milk.

Mixed feeding (MF): Feeding infant both breast milk and other liquids (such as water, tea, formula, animal milk) or foods (such as porridge or rice).

Source: Tanzania National PMTCT guidelines: May 2007 [37]

5.4.4.3 *Reported infant feeding practices two months after delivery*

Overall, 330 (81.9%) women were seen at the second month follow up visit of whom 21 had lost their babies. Information on infant feeding was collected from 309 of whom 239 (77.4%) reported to practice EBF, 44 (14.2%) reported to have used replacement feeding and 26 (8.4%) reported to have used mixed feeding

Nine of 239 EBF women reported giving the infants both water and traditional medicine, 15 reported giving traditional medicine and 14 reported giving water in addition to breast milk. Therefore, the number of women practising EBF at the second month follow up visit was 201 (65.1%) and the number of women who were mixed feeding was 64 (20.7%).

5.4.4.4 *Reported infant feeding practices three months after delivery*

Similarly, at the third month follow up visit, 316 (78.4%) women were seen of whom 22 had lost their babies. Information on infant feeding was collected from 294 of whom 195 (66.3%) reported to have been EBF. However, 1 reported giving both water and traditional medicine, 15 reported giving traditional medicine and 11 reported giving water in addition to breast milk. Thus 168 (57.1%) were practising EBF, 57 (19.4%) reported to have used replacement feeding and 69 (23.5%) were practising mixed feeding.

5.4.4.5 *Reported infant feeding practices four months after delivery*

Overall, 328 (81.4%) women were seen at the fourth month follow up visit of whom 27 had lost their babies. Information on infant feeding was collected from 301 women of whom 155 (51.5%) reported to have been EBF (Table 5-11) but 3 of the 155 reported giving both water and traditional medicine, 17 reported giving traditional medicine and 8 reported giving water in addition to breast milk. Thus 127 (42.2%) were practising EBF, 89 (29.6%) reported to have used replacement feeding and 85 (28.2%) were practising mixed feeding (Table 5-12).

Table 5-11 Infant feeding method at follow up visits as reported by mothers

	Month 1 n (%)	Month 2 n (%)	Month 3 n (%)	Month 4 n (%)
Total	339	309	294	301
Exclusive breast feeding	302 (89.1)	239 (77.4)	195 (66.3)	155 (51.5)
Replacement feeding	23 (6.8)	44 (14.2)	57 (19.4)	89 (29.6)
Mixed feeding	14 (4.1)	26 (8.4)	42 (14.3)	57 (18.9)

Table 5-11 shows the infant feeding methods that were reported by the women during the follow up visits. As expected the majority started by practising EBF but the proportion in this group declined at every follow up visit and by the fourth month follow up visit, only 51.5% of women seen at this visit were still practising EBF.

When definition of EBF was reclassified as indicated in Box 5-1 from the PMTCT guidelines [37] we found that by the four month follow up visit 28.2% of the women were practising mixed feeding and only 42.2% were practising EBF (Table 5-12)

Table 5-12 Infant feeding method at follow up visits after reclassification to include water and traditional medicine as mixed feeding

	Month 1 n (%)	Month 2 n (%)	Month 3 n (%)	Month 4 n (%)
Total	339	309	294	301
Exclusive breast feeding	259 (76.4)	201 (65.1)	168 (57.1)	127 (42.2)
Replacement feeding	23 (6.8)	44 (14.2)	57(19.4)	89 (29.6)
Mixed feeding	57 (16.8)	64 (20.7)	69 (23.5)	85 (28.2)

5.5 Piot-Fransen models

From the previous sections, the proportion of women accessing different PMTCT and maternal syphilis screening and treatment steps were estimated. To build the Piot-Fransen model for completion of PMTCT steps, two data sources were used; the cross-sectional study data were used to provide the proportion of women who received PMTCT HIV pre-test counselling, the proportion of women who accepted and tested for HIV and the proportion who received their HIV results. The cohort study data were used to estimate the proportion of HIV-positive women who were given ARV for PMTCT, who used the medication as required, the proportion of infants who received ARV for PMTCT, the proportion of women who were counselled on infant feeding options and the proportion of infant not mixed fed by the end of fourth month follow up visit.

To build the Piot-Fransen model for maternal syphilis screening and treatment, cross-sectional study data were used to estimate the proportion of women who were screened for syphilis, and if RPR positive, the proportion that were treated and the proportion of infants who were treated at birth.

5.5.1 Piot-Fransen model for completion of PMTCT interventions

Table 5-13 shows the proportion of pregnant women accessing different PMTCT interventions in Mwanza city and the proportion that successfully completed each step as indicated in the PMTCT guidelines. These proportions have been explained in the previous sections of this chapter.

The information shown in Table 5-13 and Table 5-14, uses 3 different denominators i.e. women attending an ANC during pregnancy, HIV-positive women who required ARV for PMTCT and whose infants required ARV for PMTCT and women who had live birth and whose infant remained alive at each follow up visit (these also changes at each follow up visit). From these three denominators three Piot-Fransen models were built (Figure 5-1 to Figure 5-3). Proportions that are indicated in these three models were combined to produce a hypothetical model assuming 1000 HIV-positive women admitted for delivery at BMC and STRH in Mwanza city.

Table 5-13 Women who completed various PMTCT interventions[4]

PMTCT intervention	N	n	%
HIV testing	1137	903	79.4
Given ARV prophylaxis for PMTCT[5]	356	270	75.8
Mother used ARV medication for PMTCT	270	260	96.3
Infants used ARV prophylaxis[6]	386	318	82.4
Received counselling on infant feeding before discharge from the hospital	385	281	73.0
No mixed feeding at month 1 follow up	339	282	83.2
No mixed feeding at month 2 follow up	309	245	79.3
No mixed feeding at month 3 follow up	294	225	76.5
No mixed feeding at month 4 follow up	301	216	71.8

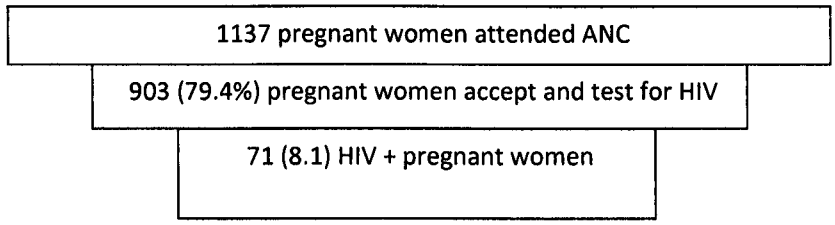
[4] All women regardless of whether they completed the preceding step or not
[5] Only women who were tested before delivery
[6] Excluding 17 still-birth

Table 5-14 Women who completed PMTCT interventions[7]

PMTCT intervention	N	n	%	Overall (%)[8]
HIV testing	1137	903	79.4	$\frac{903}{1137}$ (79.4)
Given ARV prophylaxis for PMTCT[9]	356	270	75.8	$\frac{270}{356}$ (75.8)
Mother used ARV medication for PMTCT	270	260	96.3	$\frac{260}{356}$ (73.0)
Infants used ARV prophylaxis[10]	248	220	88.7	$\frac{220}{338}$ (65.1)
Received counselling on infant feeding before discharge from the hospital	220	176	80.0	$\frac{176}{338}$ (52.1)
No mixed feeding at month 1 follow up	160	133	83.1	$\frac{133}{302}$ (44.0)
No mixed feeding at month 2 follow up	147	122	83.0	$\frac{122}{279}$ (43.7)
No mixed feeding at month 3 follow up	143	115	80.4	$\frac{115}{266}$ (43.2)
No mixed feeding at month 4 follow up	146	114	78.1	$\frac{114}{275}$ (41.4)

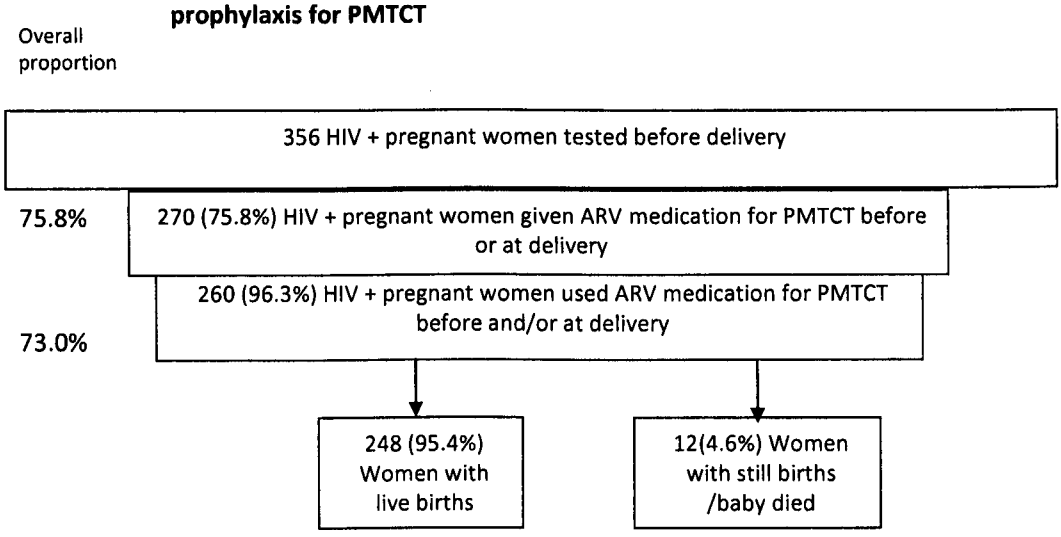
[7] Only those who successfully completed the preceding interventions
[8] The denominator is all women eligible for the intervention (in Table 5-13)
[9] Only women who were tested before delivery
[10] Excluding still-birth

Figure 5-1 Proportion of pregnant women offered and accepting HIV testing pre-delivery – cross-sectional study data



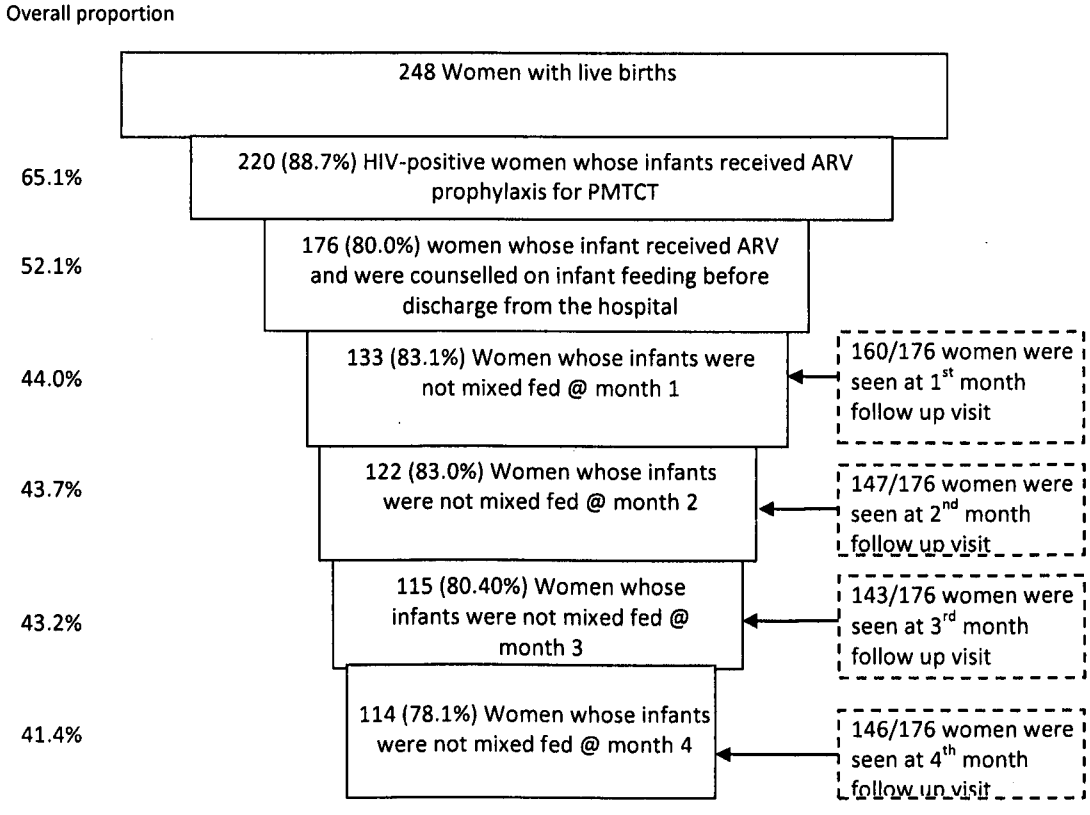
Assuming an equal HIV prevalence among women tested and those who were not tested, 21 HIV-positive women out of 234 women who attended ANC during pregnancy and who delivered in hospital during the study period, did not get the interventions that they required.

Figure 5-2 Proportion of HIV-positive women tested before delivery who received ARV prophylaxis for PMTCT



Of the 356 women tested before delivery, 270 (75.8%) received ARV for PMTCT and 260 (73.0%) used ARV medication for PMTCT. Among the 260 women who used ARV for PMTCT, 12 women had a stillbirth, thus 248 HEI whose mothers used ARV for PMTCT are being taken to the next step of the Piot Fransen model.

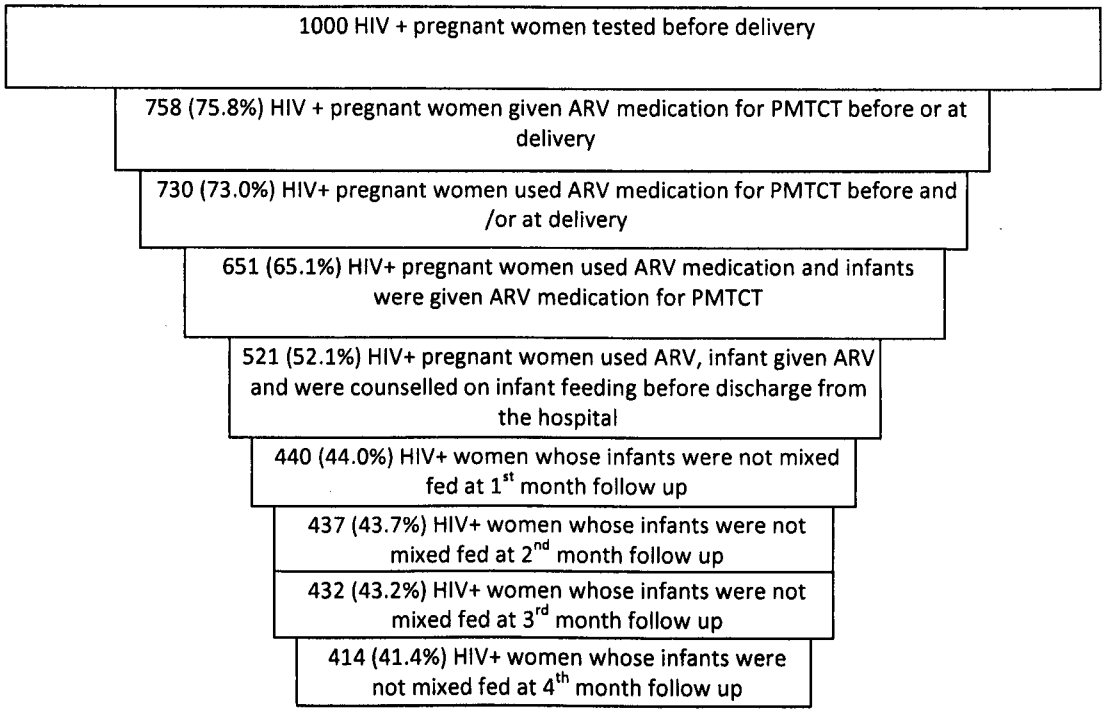
Figure 5-3 Proportion of HIV-positive women tested before delivery who received ART during pregnancy and/or in labour and whose infants received ARV and were not mixed fed[11]



[11] Denominators used to calculate the overall proportions are the number of women who were eligible for that particular intervention e.g.

1. For the overall proportion of women whose infants took ARV for PMTCT and who were counselled on infant feeding, the denominator was all women who had live birth (n=338).
2. For the overall proportion of women were tested before delivery and whose infants were not mixed fed 4 months after birth, the denominator was women who were seen at each month follow up visit, whose infants were alive at the time of the follow up and who were tested before delivery (n=275)

Figure 5-4 HIV-positive women who successfully complete PMTCT intervention in Mwanza city assuming a hypothetical population of 1000 HIV-positive women tested before delivery.



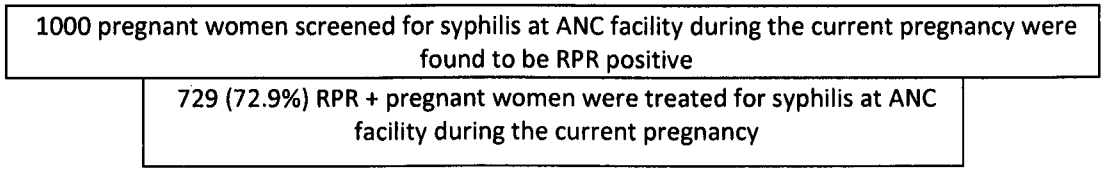
5.5.2 Piot-Fransen model for completing maternal syphilis screening and treatment interventions

Table 5-14 shows the number and proportion of pregnant women admitted for delivery at STRH and BMC who were screened for syphilis and, for those who were found to be RPR positive, the number and proportion of those who were treated and the number, and proportion of infants who received treatment before discharge from the hospital after birth. The proportions given in this table were used to build the Piot Fransen model.

Table 5-15 Proportion of pregnant women successful completed maternal syphilis screening and treatment during pregnancy – cross-sectional data.

Total women interviewed who had brought their ANC cards	1137	
Women screened for syphilis at ANC	1002/1137	(88.1%)
RPR positive	59/1002	(5.9%)
Treated for syphilis	43/59	(72.9%)
Infant treated after birth		0

Figure 5-5 RPR-positive women who received treatment in Mwanza city assuming a hypothetical population of 1000 RPR-positive women screened at ANC



5.6 Discussion

5.6.1 PMTCT implementation

5.6.1.1 *HIV testing at ANC – findings from the review of PMTCT records at the ANC*

From a review of the ANC clinic records, it was not possible to estimate the proportion of women who attended ANC for the first time during the current pregnancy and who were not offered HIV test or who were screened for syphilis. This was due to the fact that there was no separate record for women being referred from outside the study ANC facilities and those who were attending the facilities for the first time. This finding prompts for an urgent need of a system that will allow separate records of the two types of clients who attend ANC. The current system leads to over-estimating of the service utilization.

A high proportion (97.5%) of pregnant women who received PMTCT HIV pre-test counselling accepted the HIV test and 8.3% were HIV-positive, However, half of the HIV-positive women were not given any ARV for PMTCT following an HIV-positive test at the ANC. This might be partially explained by fact that some women who were referred from other facilities and who tested HIV-positive might have not returned to collect their medication.

Less than 1% of the male partners of both HIV negative and HIV-positive women were tested at the ANC. The overall HIV prevalence among partners who were tested at ANC facilities was 22.9%. This was very high when compared to the HIV prevalence in women (8.3%). Nevertheless it was learnt that sometimes in order to ease the HIV status disclosure among couples, HIV-positive women were advised to bring their partners so that they can have couple HIV counselling and testing, this might have resulted into having more partners of HIV-positive women coming for the HIV test at the ANC.

5.6.1.2 *PMTCT services at the maternity wards- findings from review of records*

Between 1st September 2007 and 31st August 2008, 48.3% of all women admitted for delivery at BMC and STRH had a known HIV status on admission for delivery and a further 27.2% were tested at the maternity ward. Overall, 24.5% of pregnant women admitted for delivery at these two large hospitals in Mwanza city did not test HIV for PMTCT. A similar proportion of women were tested for HIV at the two maternity wards.

During the record review, there were incomplete data on other PMTCT interventions that are offered at the maternity ward such as ARV use for both mothers and infants, therefore this information was not presented in this chapter.

5.6.1.3 *HIV testing for PMTCT - findings from the cross-sectional study at BMC and STRH*

Nine hundred and three women among 1137 (79.4%) who were admitted for delivery at the two maternity wards had tested for HIV and had a documented HIV test result on their ANC cards. Of these women who were tested, 77 (8.5%) had not received PMTCT pre-test counselling. It was learnt at the ANC that some women missed the PMTCT HIV pre-test counselling because they arrived at the ANC facility late. However, since a blood sample is normally taken for other routine

test and the remaining blood samples and the ANC cards are then handed to the PMTCT counsellor for the HIV test it happens that even those who did not attend the education sessions are tested although this is contrary to the National PMTCT guidelines [37].

It was also found that 2.9% of women who were tested for HIV did not receive individual post-test counselling. This means that these women did not get an explanation of what the results meant. For HIV-positive pregnant woman this constitutes a missed opportunity of getting information on available PMTCT interventions.

5.6.1.4 *Use of ARV for PMTCT findings from the cohort study*

Overall, 270 (75.8%) of HIV-positive pregnant women who were tested before delivery received ARV medication either for their own health (HAART) or for PMTCT (ARV prophylaxis). Eleven women (47.8%) of pregnant women who were tested at the maternity wards before delivery did not receive any ARV prophylaxis for PMTCT. Similarly, 26% of women who tested HIV-positive at ANC facilities and 13% of women who tested HIV-positive before pregnancy did not receive any ARV medication to protect their unborn babies. This indicates a failure in the implementation of PMTCT considering that these women had an opportunity to delivery in hospitals that provide PMTCT services.

At least 318 (83.0%) HIV-exposed infants (HEI) who were alive at discharge from hospital received ARV prophylaxis prior discharge from the hospital. This might be an underestimate due to the fact that some of the HEI were not yet discharged from the hospital during the cohort recruitment. About 13 HIV-positive women whose infants were not yet discharged from the hospital during the cohort recruitment interviews were not seen during the first month follow up visit. Nevertheless, these findings indicate that 17% of HEI born in hospitals that offer PMTCT services did not receive any ARV prophylaxis for PMTCT.

It is interesting to learn that the majority (60.4%) of the HEI who received ARV for PMTCT were given an effective combined and longer therapy that is currently recommended for HEI born to ART naïve mothers, mothers who use combined therapy for less than 4 weeks or mothers who use sdNVP for PMTCT during true labour.

5.6.1.5 *Counselling on infant feeding-findings from the cohort study*

Findings from this study indicate about 27% of HIV-positive women who delivered in hospital were not given any counselling on safer infant feeding practices. In addition, the majority (85.1%) of women who had not been counselled on infant feeding options at delivery were not certain about which infant feeding methods they should use for their infants by the time of the interview. This indicates the importance of infant feeding counselling on HIV-positive mothers' decision about infant feeding choices. Coutsoudis A, *et al* reported that as much as 42% of MTCT of HIV among children with known timing of the infection was due to breastfeeding [32], therefore in order to optimize the PMTCT services in our study settings there is an urgent need to improve on counselling about infant feeding options..

5.6.1.6 *Reported actual infant feeding practices during the follow up*

Definitions of infant feeding options were adopted from the National PMTCT guidelines of 2007 [37]. (See Box 5-1). The proportion of infants who were not mixed fed decreased gradually from 83.3% at the first month follow up to 71.8% at the fourth month follow up visit (Table 5-12). However, this proportion would have been increased by 9% if these women were aware that giving their infants traditional medicine and water constitutes mixed feeding according the definitions that were used as shown in Table 5-11. By the end of the four months follow up, only 42.2% reported practising EBF.

5.6.2 Piot-Fransen models

5.6.2.1 *Completion of PMTCT interventions*

An analysis of the cumulative number of fall off at each step of the PMTCT-services was conducted using the information that was collected at recruitment and at each follow up visit. As described in Table 5-14 and figure 5-4 above. The largest fall-off occurred between testing and using ARV for PMTCT. Factors that are associated with this finding are discussed in Chapter 6. Overall, 41.4% of HIV-positive women successfully completed all the steps in PMTCT.

5.6.3 Maternal syphilis screening and treatment services

5.6.3.1 *Key findings from the record review at ANC*

In total, 8169 women were screened for syphilis over a period of one year. This total is slightly higher than the number of women attending ANC facilities for the first time during the current

pregnancy indicating that other women were referred from other ANC facilities for syphilis screening as the case for HIV testing. For this reason, again it was not possible to estimate the proportion of women who were screened when attending the ANC for the first time. Five hundred and thirty eight (6.6%) women were RPR positive but only 35.5% were treated before delivery. It was learnt that the main reason for not being treated was the fact that sometimes there were no medication at the facilities and women were asked to buy their medication; on the other hand treatment rate might be underestimated since it is not known how many women after getting their results were treated somewhere else other than at the testing facility.

5.6.3.2 *Syphilis screening and treatment key findings from the cross-sectional study*

The majority (88.1%) of pregnant women attending ANC at least once during pregnancy were screened for syphilis. For those who were screened for syphilis, 5.6% were RPR positive. Of those who were RPR positive, 17% were not treated during pregnancy. The reasons for not being treated are assumed to be similar to those given above from the record review study.

It is recommended[106] that women who missed an RPR test during antenatal care should be tested during delivery and the test results should be obtained as soon as possible so that early treatment could be given to the infant of women who test positive and to the mothers. However, this was not done at both maternity wards and the reasons for unavailability of any services related to the prevention of congenital syphilis were unknown.

All women who were RPR positive during pregnancy had live births; However, none of these infants was treated prior to discharge from the hospital. In reality, from what was observed during the five months period the research team worked at these two main hospitals in Mwanza city, there was no treatment for both RPR positive pregnant women who were not treated at ANC facilities and infants who were born to RPR positive women at the maternity wards. The only cases that were treated were infants born with congenital syphilis who were referred to the paediatric wards. This finding is of concern because it is not known how many of these women seek treatment for their infants after discharge from the hospital and it is not known if these infants are offered treatment when they attend the under-five clinic at one month after birth.

5.6.3.3 *Completion of syphilis screening and treatment during pregnancy*

From the cross-sectional study, Table 5-15 and Figure 5-5 were produced to show the fall off at each step of the syphilis screening and treatment services among pregnant women in Mwanza City. The majority (88.1%) of our study participant were screened for syphilis and those found to be RPR positive, the majority (72.9%) were treated. Nevertheless, due to lack of infant treatment at the maternity ward in Mwanza, none of these women was considered to have completed these services.

CHAPTER 6: FACTORS INFLUENCING THE COMPLETION OF PMTCT AND MATERNAL SYPHILIS SCREENING AND TREATMENT PROGRAMMES AMONG PREGNANT WOMEN

6.1 Introduction

This chapter examines the factors influencing the completion of PMTCT and maternal syphilis screening and treatment programmes among pregnant women in Mwanza City. To address this aim, data from the cross-sectional study and the cohort study were used. For both these studies women were interviewed at the labour ward when they were admitted for delivery

6.1.1 Definition for PMTCT completion

Completion of PMTCT was defined in three different ways. First, completion of Stage 1 included women receiving an HIV test in pregnancy. Completion of Stage 2 was defined as receiving and taking any ARV during pregnancy. Completion of Stage 3 of PMTCT was defined as receiving all four key PMTCT interventions. These steps are considered separately below.

6.1.1.1 *Completion of Stage 1-HIV testing in pregnancy*

For both HIV negative and positive pregnant women, completion of Stage 1 (testing for HIV in pregnancy) was defined if they were tested for HIV during pregnancy either at the ANC or at the labour ward when they were admitted for delivery. Based on this definition, women who were tested for HIV and who had their HIV status indicated on their ANC cards during the current pregnancy was compared with women who were not tested to identify factors that were associated with failure to be tested for HIV during pregnancy. This was done using the data from a cross-sectional study at the maternity wards at two hospitals in Mwanza city.

6.1.1.2 *Completion of Stage 2-Receiving and taking any ARV during pregnancy*

HIV-positive women were considered to have completed Stage 2 of PMTCT if they received and used any ARV for PMTCT. In this definition, HIV-positive women regardless when they tested HIV-positive for the first time, who received and used any ARV, including those who either had started using HAART before this pregnancy or who started using HAART during this pregnancy or who received ARV only for PMTCT, were compared with HIV-positive women who did not use ARV for PMTCT during the current pregnancy.

Data were obtained from 356 HIV-positive women enrolled in a prospective cohort at admission for delivery at two large hospitals in Mwanza city. These women had tested HIV-positive for the first time either before the current pregnancy, during the current pregnancy at the ANC or at the maternity ward when they were admitted and tested before delivery. Women tested after delivery were excluded from this analysis.

6.1.1.3 *Completion of Stage 3-Receiving all pre and post-delivery key PMTCT interventions*

An HIV-positive woman was considered to have successfully completed Stage 3 of PMTCT if she used ARV for PMTCT and her infant was also given ARV for PMTCT and she was counselled on infant feeding and she did not practise mixed feeding to her infant by four months post-delivery.

Data from 295 HIV-positive women participating in the cohort study and who were seen at the four-month follow up visit were used for this analysis. Women who successfully completed these four key PMTCT interventions were compared with women who did not complete some of the interventions.

6.1.2 Syphilis screening and treatment

Factors associated with maternal syphilis screening and treatments were examined using the data from the cross-sectional study. Women screened for syphilis during the current pregnancy were compared with women not screened for syphilis. In addition, for women who were RPR positive, women who were treated were compared with women who were not treated for syphilis during pregnancy.

6.2 General characteristics of the cross-sectional study participants

Enrolment procedures for the 1157 women enrolled in the cross-sectional study at the maternity ward have been described in section 4.5. Twenty women had no ANC cards during admission to the labour ward for delivery and these are excluded from this analysis.

Four hundred and twenty-six participants were interviewed at Bugando Medical Centre (BMC) and 711 (62.5%) were interviewed at Sekou-Toure Regional Hospital (STRH) (Table 6-1) between 8th September and 12th October 2008. The 1127 participants had a mean age of 25.1 years (range 14 to 46 years). Ten women did not know their age. Approximately 60% were aged between 20 to 29 years. Most women were Christian with 40.0% being Roman Catholics and 35.5% other

Christians. The majority (76.4%) had received primary school education. Thirty-six percent were from the Sukuma tribe. Five hundred and forty-three (47.8%) were housewives, 548 (48.2%) reported doing unskilled work and only 46 (4.0%) had skilled work. Approximately 88.0% were married.

The majority of women (85.8%) attended ANC facilities located in Mwanza city (Table 6-2). Approximately 68.0% of 1137 women attended ANC government facilities whereas 17.8% of all women attended ANC private facilities in Mwanza City. One hundred and sixty-one participants (14.2%) attended an ANC outside Mwanza city. It was not known if these were government or private ANC facilities. Ninety- five (8.4%) attended an ANC only once during the current pregnancy. Four hundred and seventy- two (41.5%) had four or more ANC visits during the current pregnancy.

Three hundred and fifty-three (31.0%) were primigravidae, 428 (37.6%) were secundigravidae and 356 (31.3%) were multigravidae (3 or more pregnancies) (Table 6-3). Three hundred and forty eight (44.4%) participants with two or more pregnancies reported attending the same ANC facility during the previous pregnancy. Six hundred and forty seven (56.9%) reported having been tested for HIV sometime before the current pregnancy.

Two hundred and thirty-four women (20.6%) did not test for HIV during the current pregnancy, of these 176 (76.1%) were women who had been pregnant two or more times and 116 (65.9%) among these reported to have tested for HIV before the current pregnancy.

Of 234 women who did not receive an HIV test for PMTCT, 148 (63.3%) reported that they had an HIV test but they did not know why the results were not documented on their ANC cards and 86 (36.7%) women knew that they did not test HIV during the current pregnancy. Reasons for not testing for HIV during the current pregnancy were given by the 86 women who actually understood that they were not tested during pregnancy. Some women gave more than one reason and these included; test not offered 39 (45.3%), lack of the HIV test kits 39 (45.3%), refused the test 6 (7.0%) and 16 (18.6%) reported to have tested for HIV before, thus no need to repeat the test.

6.3 Factors associated with failure to test for HIV during pregnancy (Stage 1)

6.3.1 Univariate analysis

Two hundred and thirty four (20.6%) pregnant women admitted for delivery at BMC and STRH were not tested for HIV during the current pregnancy. To examine the factors associated with failure to test for HIV during pregnancy, women who had tested for HIV during the current pregnancy were compared with women who were not tested for HIV.

Table 6-1 shows the association of failure to be tested for HIV during pregnancy and selected socio-demographic characteristics and their crude odds ratios. There was little association between failure to test for HIV in pregnancy and the selected socio-demographic characteristics.

Table 6-1 Univariate association between selected socio-demographic characteristics and failure to test for HIV during pregnancy

Variables	Total n=1137	%	Not tested n=234	%	Crude OR	95% CI	P
Delivery site							0.21
BMC	426	37.5	96	22.5	1		
STRH	711	62.5	138	19.4	0.83	0.61-1.11	
Age groups							0.48
< 20 years	188	16.5	39	20.7	1		
20-24 years	401	35.3	86	21.6	1.04	0.68-1.60	
25-29 years	277	24.4	62	22.4	1.10	0.70-1.73	
30-34 years	171	15.0	26	15.2	0.69	0.40-1.18	
≥ 35 years	90	7.9	18	20.0	0.96	0.51-1.79	
Age not known	10	0.9	3	30.0	1.64	0.40-6.62	
Religion							0.67
Roman Catholics	455	40.0	90	19.8	1		
Other Christians	404	35.5	91	22.5	1.18	0.85-1.64	
Muslim	266	23.4	51	19.2	0.96	0.66-1.41	
No religion	12	1.1	2	16.3	0.81	0.17-3.77	
Education level							0.45
Secondary school or above	181	15.9	32	17.7	1		
Primary school education	874	76.9	187	21.4	1.28	0.84-1.92	
No formal education	82	7.2	15	18.3	1.04	0.53-2.05	
Tribe							0.69
Sukuma	411	36.1	82	20.0	1		
Other	726	63.9	152	20.9	1.06	0.79-1.43	
Marital status							0.81
Married	996	87.6	204	20.5	1		
Single	106	9.3	24	22.6	1.14	0.70-1.84	
Divorced/separated	27	2.4	4	14.8	0.67	0.23-1.97	
widowed	8	0.7	2	25.0	1.29	0.26-6.46	
Occupation							0.72
House wife/at home	543	47.8	116	23.4	1		
Unskilled work	548	48.2	111	20.3	0.93	0.69-1.25	
Skilled work	46	4.0	7	15.2	0.66	0.29-1.52	

Table 6-2 shows the association between failure to test for HIV in pregnancy and the ANC characteristics. Failure to test for HIV in pregnancy was strongly associated with a pregnant woman attending the ANC facility that is located outside Mwanza city during the current pregnancy (OR 1.93, 95%CI 1.31-2.87). There was a strong association between failure to test for

HIV in pregnancy and whether the woman attended a government or a private ANC facility (OR 2.09, 95%CI 1.48-2.99). Comparing women tested for HIV during pregnancy and those not tested, there was a significant difference in proportions of women who had 4 or more ANC visits during the current pregnancy compared to those who had a single ANC visit or those with two ANC visits during the current pregnancy (that is, women with 2 or less ANC visits were more likely to fail to test HIV during pregnancy compared with women with 4 or more visits).

Table 6-2 Association between ANC characteristics and failure to test for HIV during pregnancy

Variables	Total n=1137	%	Not tested n=234	%	Crude OR	95% CI	LRT P value
Location of the ANC facility							<0.001
Mwanza city Government	773	68.0	129	16.7	1		
Private	203	17.8	60	29.6	2.09	1.48-2.99	
Outside Mwanza city	161	14.2	45	27.9	1.93	1.31-2.87	
Number of ANC visits during pregnancy							<0.001
4 visits or more	472	41.5	82	17.4	1		
3 visits	348	30.6	60	17.2	0.99	0.69-1.43	
2 visits	222	19.5	55	24.8	1.57	1.06-2.31	
1 visit	95	8.4	37	39.0	3.03	1.88-4.88	

Secundigravidae and multigravidae (3 or more pregnancies) were at higher risk of failure to test HIV during the current pregnancy compared with primigravidae (16.4% vs. 23.8%; OR 1.59, 95%CI 1.11-2.28 and 28.8%; OR 1.33, 95%CI 0.91-1.95) (Table6-3).

There was no difference in failure to test for HIV in pregnancy among women who had ever had an HIV test before this pregnancy and those who had never tested for HIV. In addition, for women who had been pregnant before the current pregnancy, there was no association between failure to have an HIV test and whether the woman attended the same ANC facility in her previous pregnancy.

There was a significant decrease in proportion of women who failed to have an HIV test as the number of ANC visits increased (p-value for trend<0.001)

Table 6-3 Association between gravidity and previous HIV testing and failure to test for HIV during pregnancy

Variables	Total n=1137	%	Not tested n=234	%	Crude OR	95% CI	LRT P value
Gravidity							0.04
Primigravidae	353	31.1	58	16.4	1		
Secundigravidae	428	37.6	102	23.8	1.59	1.11-2.28	
Multigravidae	356	31.3	74	28.8	1.33	0.91-1.95	
Ever had an HIV test before this pregnancy							0.31
Yes	647	56.9	140	21.6	1		
No	490	43.1	94	19.2	0.86	0.64-1.15	
Attended the same clinic during the previous pregnancy[1]							0.12
Yes	348	44.4	69	19.8	1		
No	436	55.6	107	24.5	1.31	0.93-1.85	

[1]Women with more than one pregnancy (N=784)

6.3.2 Multivariate analysis

All variable that showed evidence of an association with failure to test for HIV in pregnancy on univariate analysis at p-value<0.1 were included in a multivariate logistic regression model (Table 6-4).

After controlling for age, it was found that there was a strong independent association between failure to test for HIV in this pregnancy and the type of ANC facility attended during pregnancy (OR 2.37; 95% CI 1.64-3.42). There was a significant difference in the proportions of women not testing HIV for PMTCT among women attending government ANC facilities in Mwanza city compared to those attending private ANC clinics in Mwanza city or ANC facilities outside Mwanza city.

Women who had few ANC visits during the current pregnancy were at a higher risk of not testing for HIV compared to women with four or more ANC visits. Women who had been pregnant more than once were at 2-fold higher odds of failure to test for HIV in this pregnancy compared to primigravidae women.

Table 6-4 Independent factors associated with failure to test for HIV in current pregnancy

Variable	Not tested n=234	%	OR[1]	95%CI	p
Facility attended					<0.001
Government ANC in Mwanza	129	16.7	1		
Private ANC in Mwanza city	60	29.6	2.37	1.64-3.42	
ANC outside Mwanza city	45	27.9	2.13	1.42-3.19	
Total number of ANC visit					<0.001
Four or more ANC visits	82	17.4	1		
Three ANC visits	60	17.2	0.94	0.65-1.38	
Two ANC visits	55	24.8	1.53	1.02-2.28	
One ANC visit	37	39.0	3.27	1.98-5.38	
Number of pregnancies					0.003
One pregnancies	58	16.4	1		
More than one pregnancy	176	22.4	1.86	1.23-2.82	

[1] Adjusted for age, type of ANC facility attended, number of ANC visits and number of pregnancies.

6.4 *General characteristics of the cohort study participants*

Overall, 403 HIV-positive women who delivered at BMC and STRH over a five month period between 8th September 2008 and 20th February 2009 were recruited into the cohort study. Forty seven (11.7%) HIV-positive women who were tested for HIV after delivery are excluded from this analysis. Of the remaining 356 HIV-positive women, 161 (45.2%) were recruited at BMC and 195 (54.8%) were recruited at STRH (Table 6-5). Participants had a mean age of 28.3 years (range 16 to 48 years). Six women did not know their age. More than 50% were aged between 20 to 29 years. Most women were Christian with 41.6% being Roman Catholics and 34.5% other Christians. The majority (74.5%) had primary school education. One hundred and fifty nine (44.7%) were from the Sukuma tribe. One hundred and sixty eight (47.2%) were housewives, 173 (49.1%) reported doing unskilled work and only 3.7% reported doing skilled work. Two hundred and forty six (69.1%) were married, 42 (11.8%) were single, 50 (14.0%) were divorced or separated and approximately 5% were widowed.

6.5 *Factors associated with failure to use ARV for PMTCT (Stage 2)*

To determine the factors associated with Stage 2 of PMTCT completion, data from 356 HIV-positive women who were enrolled in a prospective cohort at admission for delivery in Mwanza city were used. These women were tested for HIV either before pregnancy or during pregnancy

when they attended ANC or on admission to the labour ward but before delivery. They were followed up for four months post-delivery to gather information on uptake and compliance with feeding advice and other post-delivery PMTCT interventions.

6.5.1 Univariate analysis

Factors associated with not using ARV for PMTCT among HIV-positive women who were tested before delivery were assessed by comparing 260 HIV-positive women who received and used ARV for PMTCT (including pregnant women who were on HAART prior to pregnancy or who were started on HAART during pregnancy) with 96 HIV-positive women who did not use ARV for PMTCT.

Table 6-5 Association of failure to use ARV for PMTCT with selected demographic characteristics

Variable	Total n=356	%	Failed to use ARV for PMTCT (n=96) n	%	Crude OR	95% CI	P
Delivery site							0.19
BMC	161	45.2	38	23.6	1		
STRH	195	54.8	58	20.7	1.37	0.85-2.21	
Age groups							0.09
< 20 years	19	5.3	10	52.6	1		
20-24 years	78	21.9	26	33.3	0.45	0.16-1.24	
25-29 years	112	31.5	26	23.2	0.27	0.10-0.74	
30-34 years	74	20.8	16	21.6	0.25	0.09-0.71	
≥35 years	67	18.8	16	23.9	0.28	0.10-0.82	
Age not known	6	1.7	2	33.3	0.45	0.07-3.07	
Religion							0.45
Roman Catholics	148	41.6	45	30.4	1		
Other Christians	124	34.8	29	23.6	0.71	0.41-1.22	
Muslims	84	23.6	22	26.5	0.82	0.45-1.50	
Education level							0.08
Primary school education	265	74.4	79	29.8	1		
No formal education	35	9.9	8	22.9	0.69	0.30-1.60	
Secondary school or above	56	15.7	9	16.1	0.45	0.21-0.96	
Tribe							0.24
Sukuma	159	44.7	38	23.9	1		
Other	197	55.3	58	29.4	1.33	0.82-2.14	
Marital status							0.59
Married	246	69.1	65	26.4	1		
Single	42	11.8	9	21.4	0.76	0.34-1.67	
Divorced/separated	50	14.0	17	34.0	1.43	0.75-2.75	
Widowed	18	5.1	5	27.8	1.07	0.37-3.12	
Occupation							0.07
House wife/at home	168	47.2	55	32.7	1		
Unskilled	175	49.2	38	21.7	0.57	0.35-0.92	
Skilled	13	3.6	3	23.1	0.61	0.16-2.33	

Table 6-5 shows the association of not using ARV for PMTCT and selected socio-demographic characteristics and their crude odds ratios. There was no association between not using ARV for PMTCT and recruitment or delivery site, respondent's religion, tribe and marital status.

Overall, 16.1% of HIV-positive women who were tested for HIV before the current pregnancy did not use ARV medication for PMTCT (Table 6-6). This proportion is low compared to the proportion of women who did not use ARV for PMTCT among women tested at ANC during the current pregnancy (29.2%, OR 2.14, 95% CI 1.15-3.97) and those who were tested at the maternity ward before delivery (47.8%, OR 4.77, 95%CI 1.77-12.79). Women with two or one ANC visit were more likely to fail to use ARV for PMTCT when compared with women with more than two ANC visits during pregnancy.

Table 6-6 Association of failure to use ARV for PMTCT and timing of the HIV test, previous HIV testing and number of ANC visits

Variables	Total N=356	%	Failed to use ARV for PMTCT (n=96) n	%	Crude OR	95% CI	*p*
Timing of an HIV test							0.004
Before current pregnancy	93	26.1	15	16.1	1		
During current pregnancy at ANC	240	67.4	70	29.2	2.14	1.15-3.97	
During the current pregnancy at the maternity ward before delivery	23	6.5	11	47.8	4.77	1.77-12.79	
Ever had an HIV test before this pregnancy							0.020
Yes	176	49.4	38	21.6	1		
No	180	50.6	58	32.2	1.72	1.07-2.78	
Total number of ANC visits during current pregnancy[1]							<0.001
≤ 2	135	38.7	52	38.5	1		
≥ 3	214	61.3	43	20.1	0.40	0.25-0.65	

[1] Excluding women who had no ANC cards (n=7)

One hundred and sixty-seven (50.1%) among 333 HIV-positive women who tested for HIV before the current pregnancy or at the ANC during the current pregnancy attended a CTC before delivery (Table 6-7), 64 (75.3%) of 85 who did not use ARV for PMTCT were among 166 women who did not attend a CTC before delivery and 21 (24.7%) were among 167 women who attended a CTC before delivery. Women who did not attend a CTC before delivery were 4 times more likely not to

use ARV medication for PMTCT when compared with women who attended to a CTC before delivery. Failure to use ARV for PMTCT was associated with disclosure of HIV status to any person and/or husband/partners. However, there was no evidence of association between not using ARV for PMTCT and disclosing HIV status to the partner or husband only.

Table 6-7 Association of failure to use ARV for PMTCT with attendance at a CTC before delivery and disclosure of HIV status

Variables	Total n=356	%	Failed to use ARV for PMTCT (n=96) n	%	Crude OR	95% CI	P
Attended a CTC before delivery[1]							<0.001
Yes	167	50.1	21	12.6	1		
No	166	49.9	64	38.5	4.36	2.51-7.59	
HIV status disclosed to husband/partner							0.210
Yes	175	49.2	42	24.0	1		
No	181	50.8	54	29.8	1.35	0.84-2.16	
HIV status disclosed to any other person and/or husband/partner							0.040
Yes	228	64.0	53	23.3	1		
No	128	36.0	43	33.6	1.67	1.04-2.70	

[1] Excluding participants who were tested at the maternity ward (n=23)

6.5.2 Multivariate analysis

All variables that showed evidence of association with not using ARV for PMTCT on univariate analysis that reached statistical significance ($p<0.1$) were examined using multivariate logistic regression (Table 6-8). In this analysis, women who had no ANC card and those who were tested at the labour ward were excluded.

Factors selected for inclusion in the model included attendance at a CTC, total number of ANC visits during the current pregnancy, timing of the HIV test, having had an HIV test before current pregnancy, disclosing her HIV status to anyone, age, education level and occupation. Failure to attend a CTC before delivery was strongly associated with a risk of not using ARV for PMTCT (adj.

OR 3.52; 95%CI 1.76-7.01). There was about a four-fold increased risk of not using ARV for PMTCT in women with primary or no formal education when compared with women who had secondary or higher education (OR 0.28; 95%CI 0.09-0.86). Three or more visit to the ANC facility during the current pregnancy was significantly associated with a reduced risk of failure to use ARV for PMTCT (adj. OR 0.47; 95%CI 0.27-0.81).

Timing of the HIV test, having had an HIV test before current pregnancy, disclosing her HIV status to anyone, participants' age and occupation were not associated with failure to use ARV for PMTCT among HIV-positive women.

Table 6-8 Independent factors associated with failure to use ARV for PMTCT

Variables	Failed to use ARV for PMTCT (n=96) n	%	Adjusted OR[1]	95% CI	*P*
Attended to CTC before delivery					<0.001
Yes	21	12.9	1		
No	64	38.8	3.52	1.76-7.01	
Education level					0.014
Primary/No formal education	80	28.6	1		
Secondary or above	5	10.4	0.28	0.09-0.86	
Total ANC visits during current pregnancy					0.006
≤ 2	46	37.1	1		
≥ 3	39	19.1	0.47	0.27-0.81	

[1]Adjusted for age, education level, total ANC visits during pregnancy and whether attended a CTC before delivery

6.6 Factors associated with failure to complete 4-key PMTCT interventions (Stage 3)

An HIV-positive woman was considered to have successfully completed Stage 3 of PMTCT if she used ARV for PMTCT and her infant was given ARV for PMTCT and she was counselled on infant feeding and she did not practise mixed feeding to her infant.

Women who completed the four key PMTCT interventions described above were compared with women who did not complete all interventions (these include those who did not complete any or some of the four key interventions). Data from 295 HIV-positive women participating in the cohort study and who were seen at the four-month follow up visit were used for this analysis.

6.6.1 Univariate analysis

Table 6-9 shows the association of failure to complete the four key interventions and selected socio-demographic characteristic and their crude odds ratios. Women recruited at BMC were less likely to fail to complete the four key PMTCT interventions than women recruited at STRH (53.3% versus 68.3%; OR 1.89, 95%CI1.18-3.04).

Table 6-9 Association of failure to completion of four key PMTCT interventions with selected demographic characteristics

Variables	Total n=295	%	Failed to completed 4 key PMTCT interventions n=181 n	%	Crude OR	95%CI	p
Delivery site							0.008
BMC	137	46.4	73	53.3	1		
STRH	158	53.6	108	68.3	1.89	1.18-3.04	
Age groups							0.12
≤ 20 years	16	5.5	14	87.5	1		
20-24 years	60	20.7	39	65.0	0.26	0.05-1.28	
25-29 years	88	30.4	50	56.8	0.19	0,04-0.88	
30-34 years	63	21.7	38	60.3	0.22	0.05-1.04	
≥ 35 years	63	21.7	35	55.6	0.18	0.04-0.85	
Religion							0.18
Roman Catholics	123	41.7	73	59.3	1		
Other Christians	104	35.3	71	68.3	1.47	0.85-2.55	
Muslims	67	22.7	37	55.2	0.84	0.46-1.54	
No religion	1	0.3	0	-	-	-	
Education level							0.002
Primary/No formal education	248	84.1	162	65.3	1		
Secondary or above	47	15.9	19	40.4	0.36	0.19-0.68	
Tribe							0.48
Sukuma	131	44.4	78	59.5	1		
Other	164	55.6	103	62.8	1.10	0.83-1.46	
Marital status							0.16
Married	206	69.8	124	60.2	1		
Single	37	12.5	23	62.2	1.08	0.53-2.23	
Divorced/separated	36	12.3	27	75.0	1.98	0.88-4.43	
Widowed	16	5.4	7	43.7	0.51	0.18-1.43	
Occupation							0.44
House-wives/at home	131	44.4	85	64.9	1		
Unskilled work	152	51.5	90	58.8	0.78	0.48-1.27	
Skilled work	12	4.1	6	50.0	0.54	0.16-1.77	

[1] Excluding women with unknown age (n=5)

On univariate analysis, women with no formal education or with primary education were more likely to fail to complete the four key PMTCT interventions compared to women with higher education (secondary school or above) (65.3% vs. 40.4%; OR 2.78, 95%CI 1.47-5.25). However, failure to complete all four key PMTCT interventions was not associated with age, religion, tribe, occupation or marital status.

There was a high proportion of women who failed to complete the four key PMTCT interventions among women who were tested for HIV at the maternity ward compared to both women who were either tested at ANC during the current pregnancy or tested before the current pregnancy (85.7% versus 61.6% and 54.8% respectively) (Table 6-10). There was no association between failures to complete the PMTCT interventions and the total number of ANC visits during that pregnancy.

Table 6-10 Association of failure to complete Stage 3 and timing of the HIV testing, previous HIV testing and number of ANC visits.

Variables	Total n=295	%	Failed to completed 4 key PMTCT interventions n=181		Crude OR	95%CI	*p*
			n	%			
Timing of an HIV test							0.020
Before current pregnancy	84	28.5	46	54.8	1		
During current pregnancy at ANC	190	64.4	117	61.6	1.32	0.7-2.23	
Testing at the maternity ward before delivery	21	7.1	18	85.7	4.96	1.35-18.11	
Ever had an HIV test before this pregnancy							0.030
No	149	50.5	100	67.1	1		
Yes	146	49.5	81	55.5	0.6	0.38-0.98	
Total ANC visits during current pregnancy[1]							0.340
≤ 2	109	37.8	70	64.2	1		
≥ 3	179	62.2	105	58.7	0.79	0.48-1.29	

[1] Excluding women whose ANC cards were not seen n=7

In total, 127 of 264 (48.1%) women who were tested at ANC during or before the current pregnancy and who were seen four months after delivery had not attended a CTC before delivery (Table 6-11). Of these 127 women, 90 (70.9%) failed to complete the four key PMTCT interventions compared with 49.7% women who did attend a CTC (OR 2.47, 95%CI 1.49-4.07).

There was no difference in failure to complete PMTCT interventions among women who had disclosed their HIV status to their partners/husband compared to those who had not disclosed (59.7% versus 64.0%, OR 0.83, 95%CI 0.57-1.35). However, there was an association between failure to completion of four key PMTCT intervention with disclosure of HIV status to any other person including husbands/partners (54.7% versus 71.9%, OR 0.47; 95%CI 0.28-0.78)

Table 6-11 Association of failure to complete Stage 3 with attendance to a CTC before delivery and disclose of HIV status.

Variable	Total n=295	%	Failed to completed 4 key PMTCT interventions (n=181) n	%	Crude OR	95% CI	P
Attended to CTC before delivery[1]							0.001
Yes	147	53.6	73	49.7	1		
No	127	46.4	90	70.9	2.47	1.49-4.07	
HIV status disclosed to partner/husband							0.452
Yes	181	61.4	108	59.7	1		
No	114	38.6	73	64.0	1.20	0.74-1.95	
HIV status disclosed to any other person including husband/partner							0.003
Yes	243	82.4	140	57.6	1		
No	52	17.6	41	78.8	2.74	1.34-5.59	

[1] Excluding participants who were tested at the maternity ward and seen 4 months after delivery (n=21)

6.6.2 Multivariate analysis

On univariate analysis, failure to complete PMTCT interventions was associated with delivery site, education level, timing of an HIV test, previous HIV testing, attendance at a CTC before delivery and disclosure of her HIV status to any other person including husband/partners. These variables were then examined using multivariate logistic regression (Table 6-12).

After adjusting for age and timing of the HIV test it was found that there was a strong association between failure to complete the four key PMTCT interventions and attending a CTC before delivery (adj. OR 2.68; 95%CI 1.46-4.93). There was a four-fold increased risk of failure to complete the PMTCT interventions in women with primary or no formal education when compared with women with secondary or higher education (adj. OR 0.26; 95%CI 0.12-0.56). There was no association between failure to complete PMTCT interventions and other variables that showed an association on univariate analysis.

Table 6-12 Independent factors associated with failure to complete four key PMTCT interventions.

Variable	Failed to completed 4 key PMTCT interventions (n=158) n	%	Adjusted OR[1]	95% CI	P
Attended to CTC before delivery					0.001
Yes	73	49.0	1		
No	87	70.2	2.68	1.46-4.93	
Education level					<0.001
Primary or no formal education	145	63..4	1		
Secondary or higher	13	33.3	0.26	0.12-0.56	

[1]Adjusted for age, education level, and whether attended a CTC before delivery

6.7 Factors associated with failure to receive syphilis screening and treatment during pregnancy

In total, 135 (11.9%) of 1137 pregnant women admitted at BMC and STRH had not been screened for syphilis during the current pregnancy. Fifty-nine out of 1002 pregnant women who were screened for syphilis during pregnancy were found to be RPR positive. Of the 59 who were found to be positive, 16 (27.1%) were not treated for syphilis before delivery.

6.7.1 Univariate analysis

Table 6-13 shows the association of not being tested for syphilis and selected socio-demographic characteristics and their crude odds ratios. Apart from a weak association between not screening for syphilis during pregnancy and tribe (OR 0.77; 95% CI 0.50-1.04), there was no evidence of an

association between syphilis screening status during this pregnancy and other selected socio-demographic characteristics.

Table 6-13 Univariate association between failure to receive syphilis screening during pregnancy and selected socio-demographic characteristics.

Variables	Total n=1137	%	Not n=	%	Crude OR	95% CI	P
Delivery site							0.62
BMC	426	37.5	48	11.3	1		
STRH	711	62.5	87	12.2	1.09	0.75-1.60	
Age groups							0.70
< 20 years	188	16.5	27	14.4	1		
20-24 years	401	35.3	42	10.5	0.70	0.41-1.17	
25-29 years	277	24.4	31	11.2	0.75	0.43-1.31	
30-34 years	171	15.0	20	11.7	0.79	0.43-1.47	
≥35 years	90	7.9	13	14.4	1.01	0.49-2.06	
Age not known	10	0.9	2	20.0	1.49	0.30-7.40	
Religion							0.32
Roman Catholic	455	40.0	57	12.5	1		
Other Christian	404	35.5	50	12.3	0.99	0.66-1.48	
Muslim	266	23.4	25	9.4	0.72	0.44-1.19	
No religion	12	1.1	3	25.0	2.33	0.61-8.85	
Education level							
Secondary school or above	181	15.9	15	8.3	1		0.21
Primary school education	874	76.9	11	12.7	1.61	0.91-2.83	
No formal education	82	7.2	9	11.0	1.36	0.57-3.26	
Tribe							0.08
Sukuma	411	36.1	58	14.1	1		
Other	726	63.9	77	10.6	0.77	0.50-1.04	
Marital status							0.15
Married	996	87.6	11	11.3	1		
Single	106	9.3	13	12.3	1.09	0.59-2.01	
Divorced/separated	27	2.4	7	25.9	2.73	1.13-6.61	
Widowed	8	0.7	2	25.0	2.60	0.52-13.06	
Occupation							0.27
House wife/at home	543	47.8	56	10.3	1		
Unskilled work	548	48.2	72	13.1	1.31	0.91-1.91	
Skilled work	46	4.0	7	15.2	1.56	0.67-3.65	

Table 6-14 shows the association between not being screened for syphilis and ANC characteristics. Not being screened for syphilis during pregnancy was strongly associated with attending an ANC facility outside Mwanza city during pregnancy (OR 4.9; 95%CI 3.22-7.40). However, there was no difference in the proportion of women who failed to be screened and who attended a government or a private ANC in Mwanza city (8.7% vs. 8.4% respectively). There was a strong evidence of association between not screening for syphilis during pregnancy and attending 2 or less ANC visits during pregnancy (p<0.0001)

Table 6-14 Association between not screening for syphilis during pregnancy and ANC characteristics.

Variables		Total n=1137	%	Not Screened n=135	%	Crude OR	95% CI	P
Location of the ANC facility								<0.001
Mwanza city	Government	773	68.0	67	8.7	1		
	Private	203	17.9	17	8.4	0.96	0.55-1.68	
Outside Mwanza city		161	14.1	51	31.7	4.9	3.22-7.40	
Number of ANC visits during pregnancy								<0.001
4 visits or more		472	41.5	34	7.2	1		
3 visits		348	30.6	34	9.8	1.39	0.85-2.29	
2 visits		222	19.5	37	16.7	2.58	1.57-4.23	
1 visit		95	8.4	30	31.6	5.95	3.41-10.37	

6.7.2 Multivariate analysis

Variables that showed evidence of association with not screening for syphilis during pregnancy at p<=0.1 were then examined using multivariate logistic regression (Table 6-15). There was a strong association between not screening for syphilis during pregnancy and attending 2 or less ANC visits in that pregnancy. There was a six-fold increased risk of failure to screen for syphilis during the current pregnancy among women who attended ANC facilities located outside Mwanza city compared to those who attended ANC facilities within the city. On a multivariate analysis, there was no evidence of an association between not screening for syphilis during pregnancy and tribe.

Table 6-15 Independent factors associated with not screening for syphilis during pregnancy.

Variables	Not Screened n=135	%	Adjusted OR[1]	95% CI	P
Number of ANC visits during pregnancy					<0.001
4 visits or more	34	7.2	1		
3 visits	34	9.8	1.29	0.77-2.17	
2 visits	37	16.7	2.79	1.66-4.69	
1 visit	30	31.6	7.54	4.15-13.70	
Location of the ANC facility					<0.001
Mwanza city	84	8.7	1		
Outside Mwanza city	51	31.7	5.86	3.82-8.97	

[1]Adjusted for age, total ANC visits during pregnancy and location of the ANC facility

6.8 Discussion

6.8.1 Factors associated with failure to test for HIV during pregnancy

The findings from the cross-sectional study indicate that a high proportion (79.4%) of pregnant women admitted for delivery at BMC and STRH were tested for HIV during pregnancy either at the ANC or when they were admitted for delivery before or after delivery. HIV testing for PMTCT among pregnant women in Mwanza city was mainly associated with the number of ANC visits during that pregnancy, the type and location of the ANC facility where the woman attended during pregnancy and whether the woman had ever been pregnant before the current pregnancy (Table6-4).

Although it was not clear from documented information on the women's ANC cards when the HIV test was done, the finding that women who attended an ANC only once during the current pregnancy were at a higher risk of failure to have an HIV test for PMTCT suggests that other pregnant women may not test HIV during the first ANC visit, despite this being the recommendation in the national PMTCT guidelines [37]. Reasons for this might include attending an ANC facility that does not offer PMTCT services, arriving at the ANC facility for the first visit late in the day or simply not being offered the services when they attend for the first visit due to other reasons such as lack of resources (including test kits and human resources).

Although more than 70% of pregnant women, who attended ANC at private facilities in Mwanza city had an HIV test for PMTCT it was not possible to determine whether the test was done at that actual private facility because this was not indicated on their ANC cards. However, the association

between attending a private ANC facility and failure to have an HIV test during pregnancy reveals the fact that HIV testing for PMTCT may not be offered consistently in private facilities in Mwanza city. This fact is supported by the findings of the record review (section 5.2.1.1) indicating that women who attend private facilities may get referral or do a self-referral to the government ANC clinics to have an HIV test for PMTCT. This led to higher numbers of women being documented as testing for HIV compared with the number of women being documented as attending government ANCs for the first time during the current pregnancy.

At this stage of the scaling-up of PMTCT in Tanzania, it is expected that PMTCT coverage is higher in urban areas compared to rural areas, explaining the association between attending ANC facility located outside Mwanza city and failure to have an HIV test during pregnancy.

Women who had had two or more pregnancies were more likely to not be tested HIV for PMTCT compared with primigravidae. However, more than 60% of women who had had previous pregnancies reported to have had an HIV test previously and therefore might not want to test for HIV again. Others might have not been tested for PMTCT previously and therefore if the service is not offered to them in this pregnancy do not think to ask for a referral to test.

Finally, the findings that there was no association between many socio-demographic characteristics and testing for HIV during pregnancy suggests that offering HIV testing during pregnancy as an opt-out services in ANC reaches and is accepted by a range of pregnant women equally.

6.8.2 Factors associated with failure to complete Stage 2 and Stage 3

The study found that failure to use ARV for PMTCT (Stage 2) and failure complete four key PMTCT interventions among HIV-positive women was associated with failure to attend a CTC before delivery, low educational level and fewer number of ANC visits during the current pregnancy.

More than 50% of HIV-positive women who were tested before the current pregnancy or at the ANC during the current pregnancy did not attend a CTC before delivery. Failure to attend at a CTC before delivery was found to be strongly associated with both not using ARV for PMTCT and failure for completion of four key PMTCT interventions. Presumably HIV-positive women who attend a CTC had an opportunity to learn more about the interventions available to them and are

better motivated to look after their own health therefore have an opportunity to benefit from these interventions. Characteristics of pregnant women identified through PMTCT who attended CTCs will be discussed in chapter 8.

Participants' low education level was associated with both not using ARV for PMTCT (Stage2) and failure to complete four key PMTCT interventions (Stage 3). Improving the information that is given to HIV-positive pregnant women during the individual HIV post-test counselling is essential to ensure that women clearly understand all the interventions that are available after being tested and the importance of each intervention as far as preventing the infant from getting HIV infection is concerned. In addition, on-going support and counselling to encourage uptake and adherence to PMTCT interventions is vital.

From the cohort study, it was found that women who attended an ANC clinic once or twice during the current pregnancy were at a higher risk of failure to use ARV for PMTCT when compared with women who had three or more ANC visits during the current pregnancy. It is recommended that pregnant women who are HIV-positive should be given ARV for PMTCT starting at 28 weeks gestation or any time after that. We were not able to determine when women in this cohort were given ARV for PMTCT and why others were not given any ARV for PMTCT. Seemingly, women who test HIV-positive at ANC might not want to come back to the ANC or may not have time to come back if they attend the ANC late in pregnancy and may end up in the maternity ward with no PMTCT medication

In addition, 11.8% of women were actually given ARV for PMTCT but did not use the medication, as it was required (see section 5.5.2). When asked why the medication was not used as required, the women reported that they did not understand the instruction that they were given. This finding suggests that these women did not get on-going support at ANC and when they were admitted for delivery. Clear explanations on when the medication should be used are of crucial importance.

We found missed opportunities to implement a number of PMTCT steps among women who delivered in hospital such as testing for HIV before delivery. This calls for an urgent need of a more reliable PMTCT system in the maternity wards to fill the gap for those who deliver in

hospitals and who did not get all or some of the PMTCT interventions. PMTCT health workers in the maternity suites should be available in order to support these HIV-positive women to check whether they have received earlier PMTCT interventions and to take them through the interventions that are available at the maternity ward to maximize the successful completion of the program.

6.8.3 Factors associated with not screening for syphilis during pregnancy.

We found that failure to screen for syphilis during pregnancy was associated with attending an ANC outside Mwanza city and the fewer number of ANC visits during pregnancy (Table6-15). Apparently, health facilities in rural areas have many shortcomings and therefore these findings should be expected.

Failure to screen for syphilis during pregnancy was associated with one or two visits to the ANC facility during pregnancy compared to three or more visits. Although early and multiple visits to the ANC facilities during pregnancy are recommended [106], this finding calls for a more effective management of pregnant women when they attend ANC clinics for the first time in that pregnancy including reinforcing the recommendation to screen for syphilis at the first visit in pregnancy. If they fail to be screened at the first visit, health workers should be educated to routinely check the ANC card for syphilis test results at later ANC visit and offer screening if necessary.

Unlike HIV testing for PMTCT, there was no association between failure to screen for syphilis during pregnancy and the facility type (private versus government). If private ANC facilities can offer syphilis screening then HIV testing services could be adopted in the same private facilities if training is given.

CHAPTER 7: EFFECT OF ANTENATAL HIV EDUCATION ON CLIENTS' KNOWLEDGE OF HIV, MTCT AND PMTCT

7.1 *Introduction*

This chapter focuses on the effect of ANC HIV education on pregnant women's knowledge about HIV, MTCT and PMTCT of HIV. Data presented in this chapter were obtained from the observation study at the ANC facilities and from the cross-sectional study at the maternity ward.

7.2 *Overview of observation of ANC HIV education sessions*

Pregnant women attending ANC for the first time during the current pregnancy receive education on general knowledge about HIV and specific knowledge on mother-to-child transmission of HIV (MTCT) and prevention of mother-to-child transmission of HIV (PMTCT). Details of the steps in providing ANC HIV education are described in Box 7-1.

Box 7-1 Suggested steps in providing HIV pre-test information in the ANC setting

- ☑ Assess the clients' knowledge of HIV/AIDS and MTCT.
- ☑ Share information on benefits for counselling and testing in PMTCT.
- ☑ Provide information about HIV infection in pregnancy and the risk of MTCT.
- ☑ Discuss the meaning of HIV testing and the possible implications of negative and positive results.
- ☑ Discuss the window period and the possibility of repeat HIV testing later in pregnancy
- ☑ Talk about the benefits and possible disadvantages of sharing the HIV test results with sexual partners.
- ☑ Discuss the persons with whom clients should share HIV test results (e.g. mother, sister, in-laws).
- ☑ Discuss the interventions available to prevent MTCT and care for the mother and child if the test results are positive.
- ☑ Provide information about how to prevent HIV infection, including safer sex practices.
- ☑ Explain when the test results will be available.
- ☑ At the end of the session, allow enough time for questions and clarifications.
- ☑ Encourage and support clients to ask questions.

Source: Tanzania National PMTCT guidelines: May 2007

The aims of these ANC HIV education sessions are to increase the women's understanding and awareness of HIV and support informed decision-making about HIV testing and PMTCT services [37] According to the PMTCT guidelines, all women should participate in ANC HIV education session at their first ANC visit during the current pregnancy or as soon as possible thereafter [37].

This chapter presents a review of the observations of ANC HIV education talks and the procedures that were used to deliver information about HIV, MTCT and PMTCT of HIV to pregnant women attending ANC. In addition the content of the health education that was delivered and the participation of the pregnant women in the discussion were assessed using a modified tool adapted from the 2007 UNAIDS tools for evaluating HIV VCT manual [112], (Annex 1). Questions and issues that women were keen to learn about during these sessions were documented.

7.3 Findings from the observation of health education sessions

Between 25th November 2008 and 22nd July 2009, nine ANC HIV education sessions were observed at Makongoro, Nyamagana and Igoma RCH clinics. Three sessions were observed at each of the above-mentioned RCH clinics, which offer ANC services. All 9 sessions were facilitated by the nurses and were observed by the study principal investigator (a PhD student). In total 134 pregnant women attended the ANC HIV education sessions that were observed. The average length for the session was 26 minutes but ranged between 15 minutes to 35 minutes. The average number of participants in each session was 15 and the minimum and maximum number of participants in each session was 7 and 22 respectively. All sessions were conducted in Swahili.

At Makongoro RCH clinic, the sessions took place in a designated room known as the "PMTCT room". At Nyamagana, these ANC HIV education sessions were held at the ANC waiting area situated outside the ANC examination room along the long corridor of the main outpatient department (OPD) building. At Igoma, these sessions were held outside at the back of the Health Centre building in an open space near the footway to the neighbourhood.

7.3.1 Group relationship and participation

In all but one session, women were greeted and welcomed to participate in the HIV health education session. In 7 out of 9 sessions, facilitators introduced themselves to the group and recognised the presence of a researcher among the group. Pregnant women attending the ANC

HIV health education talks were not given an opportunity to introduce themselves in any of the sessions (Table 7-1).

In all sessions, facilitators allowed all women to participate in the discussion. In 5 out of 9 sessions, each woman was asked to contribute either by asking a question or by answering a question and this went around the circle although most women did not say anything. At the end of the session, a summary of the main issues that were discussed was given briefly in 5 sessions and in detail in one session. In 3 sessions, facilitators did not summarise the main issues that were discussed by the group.

In 6 out of 9 sessions, facilitators used clear and simple terms while in 3 sessions, the terminologies that were used were slightly complicated for the audience and the use of a mixed language (Swahili and English) was frequent. In all sessions, very little time was given to participants to understand the information that was discussed. Five facilitators had a very good up to date knowledge about PMTCT, could explain clearly all the concepts regarding HIV transmission routes, MTCT and PMTCT of HIV, and answered most of the questions that were asked correctly.

Only in 2 out of 9 sessions, facilitators reinforced important information and in 1 session, a facilitator checked on understanding and mis-understanding of the issues that were discussed by asking questions that addressed some of the common myths about HIV, MTCT and PMTCT of HIV. In 6 sessions facilitators talked about the sensitive issues clearly and appropriately

In all sessions facilitators assumed that all participants understood Swahili, therefore they did not ask if there was anyone who had problem with that language.

7.3.2 Contents of the health education

In all sessions but one, knowledge about HIV transmission was covered in detail. In 3 sessions, issues on misconceptions about HIV transmission were explained in detail but were not mentioned at all in two sessions.

In 4 sessions, the HIV testing procedure was not explained at all, thus participants were not told how the blood sample would be taken, how many blood samples would be taken and how long it

would take before receiving their HIV results. In 4 sessions, the HIV testing procedure was explained briefly whereas in one session, the procedure was explained in detail and participants in this session were relieved to understand that they will not need to come for their results on a different day (Table 7-1).

In 4 sessions the "window period" concept was explained in detail. Women were advised that if they will be tested and found to be HIV negative they would need to consider having a repeat HIV test after three months. In 2 sessions, the concept was mentioned briefly and in 3 sessions, this was not mentioned at all. Furthermore, in 2 sessions, women were not given any information regarding the meaning and possible implication of HIV-positive and HIV negative results (Table 7-1).

The value of getting the partner involved in the ANC HIV testing during pregnancy was not mentioned at all in 3 sessions, was only mentioned briefly in 3 sessions and was explained in details in 3 sessions that also emphasised the possibility of HIV discordant couples (Table 7-1).

Table 7-1 HIV topics and how they were covered during the ANC HIV health education talks at each facility.

Topic		Number of sessions NDH	Makongoro	Igoma	Total
HIV and HIV transmission	Not covered	0	0	0	0
	Covered but not in detail	0	1	0	1
	Covered in detail	3	2	3	8
Misconception about HIV transmission	Not covered	1	1	0	2
	Covered but not in detail	1	2	1	4
	Covered in detail	1	0	2	3
HIV testing process	Not covered	3	1	0	4
	Covered but not in detail	0	1	3	4
	Covered in detail	0	1	0	1
Window period	Not covered	3	0	0	3
	Covered but not in detail	0	0	2	2
	Covered in detail	0	3	1	4
Meaning and implication of results	Not covered	2	0	0	2
	Covered but not in detail	1	0	3	4
	Covered in detail	0	3	0	3
Value of getting the partner involved	Not covered	3	0	1	4
	Covered but not in detail	0	0	2	2
	Covered in detail	0	3	0	3
Potential needs and available support	Not covered	2	1	1	4
	Covered but not in detail	1	1	2	4
	Covered in detail	0	1	0	1

7.3.3 PMTCT related issues

The fact that HIV testing during pregnancy was not mandatory, that antenatal care and other services would not be denied if woman decided not to be tested for HIV during pregnancy was clearly explained to pregnant women in 1 session only. In 3 sessions this was mentioned briefly and in 5 sessions this was not mentioned at all (Table 7-2).

Information about HIV in pregnancy and the risk of transmission to the infant was explained in detail in 4 sessions, explained briefly in 4 sessions but was not mentioned at all in 1 session. Possible benefits of knowing one's HIV status and the interventions available if the woman tested HIV-positive during pregnancy was explained in details in 6 out of 9 sessions. In these sessions, women were informed on the availability of ARV for PMTCT for HIV-positive mothers during pregnancy, labour and delivery and for their infants soon after delivery. In these sessions, a brief explanation on infant feeding options for HEI was given (Table 7-2).

In 7 out of 9 sessions, it was briefly explained that ARV for PMTCT was not a cure or treatment for mothers. In 2 sessions, ARV for PMTCT was not mentioned at all (Table 7-2).

Table 7-2 PMTCT topics and how they were covered during the ANC HIV health education talks at each facility.

Topic		Number of sessions NDH	Makongoro	Igoma	Total
HIV in pregnancy and the risk of MTCT	Not covered	1	0	0	1
	Covered but not in detail	2	1	1	4
	Covered in detail	0	2	2	4
Benefits of knowing HIV status and interventions available for HIV-positive pregnant women	Not covered	1	0	0	1
	Covered but not in detail	1	0	1	2
	Covered in detail	1	3	2	6
HIV testing is not mandatory	Not covered	3	1	1	5
	Covered but not in detail	0	2	1	3
	Covered in detail	0	0	1	1
ARV therapy not a cure/treatment for mothers	Not covered	2	0	0	2
	Covered but not in detail	1	3	3	7
	Covered in detail	0	0	0	0
The need to attend maternity ANC services regularly	Not covered	2	0	0	2
	Covered but not in detail	1	1	2	4
	Covered in detail	0	2	1	3
Known adverse effects and drug interactions	Not covered	3	3	3	9
	Covered but not in detail	0	0	0	0
	Covered in detail	0	0	0	0

7.3.4 Issues noted during the observation

Key issues that were observed during the ANC HIV education talks included:-

1. In 4 out of 9 sessions, pregnant women did not ask any questions;
2. Most questions raised during these sessions were focused on the preventing the baby from getting HIV infected and it was interesting to note that women were relieved when told about the effectiveness of the ARV for PMTCT. However, there were no questions about interventions that focused on the woman's own health if she tested positive and this was not covered in all the sessions;
3. Only one couple attended the ANC HIV education talk during the observed sessions. fast track services (where the woman and her partner were not required to wait on a queue for any of the ANC services) were offered to couples who attended ANC in order to encourage male participation by reducing the time spent at the ANC;
4. In one observed session at Nyamagana RCH clinic, the facilitator did not mention anything about PMTCT although she was aware of the ongoing observation;

5. During the observation of sessions at Nyamagana and Igoma ANC facilities, a number of distractions were noted including women being called to by friends passing by and women concentrating in other things apart from listening to the talk. This was due to the fact that the sessions were conducted in an open space outside the building.

7.4 Overview of the cross-sectional study

Data were obtained from 1157 women who were admitted for delivery at Bugando Medical Centre (BMC) and Sekou-Toure Regional Hospital (STRH) between 8th September 2008 and 12th October 2008 and who participated in the face-to-face interviews that were conducted by the research assistants (clinical officers/nurses). Knowledge about HIV, MTCT and PMTCT were measured by a set of questions on knowledge about HIV prevention, MTCT and PMTCT of HIV (Annex 9). In addition, women who attended the ANC clinic during pregnancy were asked if they attended to the ANC HIV health education sessions that are offered to all pregnant women when they attend at the ANC clinic.

In regard to HIV prevention knowledge, women were required to explain how someone can protect her/himself from being infected by HIV and they were encouraged to mention all the possible measures to protect oneself from HIV. Ten pre coded answers including "others" code were included on the questionnaire.

Knowledge about MTCT of HIV was measured using four questions. First, women were asked if an HIV-positive woman can transmit HIV to her baby. Those answering "yes" to this question were then asked about the specific timing of the transmission using the following three questions

1. Can HIV-positive pregnant woman transmit HIV to her baby while in the womb?
2. Can HIV-positive pregnant woman transmit HIV to her baby during labour and delivery?
3. Can HIV-positive woman transmit HIV to her baby during breast-feeding?

Responses were "yes", "no" and "don't know". "No" and "don't know" were considered as incorrect answers.

For PMTCT knowledge, women were asked to mention steps that can be done to prevent an HIV-positive woman from transmitting HIV infection to her baby. After each response, the interviewer continued to probe until there was no further response from the respondent. Five pre-coded

answers including "others" were included in the questionnaire and wrong answers were not considered.

For the descriptive and bivariate analysis, knowledge was examined considering each variable separately and by reporting the proportion of women who gave right answer on those specific questions.

In multivariable analysis each respondent's level of knowledge was determined with a scoring system developed for each of the three topics, i.e. general HIV prevention (10 questions), MTCT of HIV (four questions) and PMTCT of HIV (five questions). Each right answer in each topic attracted one point. A person's knowledge was therefore scored out of 19 points, representing 19 questions and this was then converted in percentage.

Linear regression was used to compare the mean knowledge score among pregnant women receiving ANC HIV education sessions with those who did not to examine the effect of ANC HIV education on pregnant women's knowledge about HIV, MTCT and PMTCT of HIV.

7.5 Findings from the cross-sectional study at the maternity wards

All 1157 women who participated in the cross-sectional study at the maternity wards between 8th September 2008 and 12th October 2008 responded to the knowledge questions during the interviews.

7.5.1 HIV, MTCT and PMTCT knowledge among pregnant women - descriptive analysis

All participants were aware of HIV and AIDS. The majority (81.8%) were able to mention 2-4 out of 10 methods by which people could protect themselves from being infected with HIV. Only 15.2% were able to mention between 5 to 9 ways for someone to protect him/herself from being infected by HIV.

Overall, 1134 (98.0%) women knew that an HIV-positive woman could transmit HIV to her baby. Of these 846 (73.4%), 961 (83.1%) and 1089 (94.1%) knew that an HIV-positive woman can transmit HIV to her baby while in the womb, during labour and delivery and during breastfeeding respectively. Overall, 719 (62.1%) of all the participants answered all four MTCT knowledge questions correctly.

In total, 51.9%, 1.5%, 25.0%, 60.0% and 5.9% of all respondents knew that MTCT of HIV could be prevented by giving ARV medication to the mother during pregnancy, delivering by caesarean section, giving ARV to the infant soon after delivery, not breastfeeding the baby and using exclusive breastfeeding respectively. Only 45 (4.0%) of all respondents who knew that an HIV-positive mother could transmit HIV to her baby were able to mention up to four methods to prevent MTCT of HIV.

7.5.2 HIV, MTCT and PMTCT knowledge among pregnant women– bivariate analysis

Table 7-1 shows the proportion of women who answered some of the selected HIV, knowledge questions correctly stratified by whether the respondent received an ANC HIV education sessions at ANC or not.

In general, women who received ANC HIV education were more knowledgeable compared to women who did not receive ANC HIV education during pregnancy. Specifically to avoid sharing sharp edges and having one faithful HIV-negative partner as a way to protect from HIV infection was mentioned by a significantly higher proportion of women who received ANC HIV education compared to those who did not receive ANC HIV education (33.5% vs. 21.7 and 55.2% vs. 38.1% respectively) (Table 7-3).

Table 7-3 Knowledge on HIV by whether a woman received ANC HIV health education during pregnancy.

	Received ANC HIV health education						
	Yes (n=931)			No (n=226)			
Variables	n	%	(95% CI)	n	%	(95% CI)	*p*
What can a person do to protect her/himself from HIV infection							
Use of condom	665	71.4	68.4-74.3	151	66.8	60.3-72.9	0.172
Avoid sharing sharp edges	312	33.5	30.4-36.6	49	21.7	16.5-27.6	0.001
Have one/few partners	253	27.2	24.4-30.2	54	23.9	18.5-30.0	0.316
Having one faithful HIV-partner	514	55.2	52.0-58.4	86	38.1	31.7-44.7	<0.001
Understands that a person who looks healthy could be HIV infected	864	92.8	91.0-94.4	203	89.8	85.1-93.4	0.229

There was no significant difference in the proportion of women who received ANC HIV education and those who did not receive ANC HIV education in terms of awareness that condom use during sexual intercourse and having one or few sexual partners could prevent against HIV infection (71.4% vs. 66.8% and 27.2% vs.23.9% respectively) (Table 7-1)

Table 7-4 shows the proportion of women who answered MTCT and PMTCT knowledge questions correctly stratified by whether the respondent received an ANC HIV education talk at ANC or not. These included women who knew that HIV can be passed from an HIV-positive mother to her baby (N=1134).

There was no significant difference in proportion of women who received ANC HIV education and those who did not in terms of understanding that HIV can be passed to the infant while in the womb and during labour and delivery (76.0% vs. 70.5% and 85.7% vs. 80.9% respectively). However, a slightly higher proportion of women who received ANC HIV education compared to those who did not receive ANC HIV education understood that HIV could be passed to the baby born to an HIV-positive woman through breastfeeding (97.0% vs. 91.8%)

While in general PMTCT knowledge was low, a significantly higher proportion of women who received ANC HIV education knew that HIV from an HIV-positive mother to her baby could be prevented by not breastfeeding the baby (64.2% vs. 48.2%) and giving ARV medication to the mother during pregnancy (56.1% vs. 40.0%). Generally, knowledge about other post-delivery interventions (i.e. giving ARV to the baby soon after birth and using exclusively breast-feeding) was low in both groups.

Table 7-4 Knowledge on MTCT and PMTCT by whether a woman received ANC HIV health education during pregnancy.

	Received ANC HIV health education						
	Yes (n=914)			No (n=220)			
Variables	n	%	(95% CI)	n	%	(95% CI)	*p*
Knows that HIV can be transmitted from an HIV+ mother to her baby							
Before birth in the womb	694	76.0	73.0-78.7	155	70.5	63.9-76.4	0.173
During labour and delivery	783	85.7	83.2-87.9	178	80.9	75.1-85.9	0.161
During breastfeeding	887	97.0	95.7-98.0	202	91.8	87.4-95.1	0.003
Knows that MTCT of HIV can prevented by							
Giving ARV to the mother during pregnancy	513	56.1	52.8-59.4	88	40.0	33.5-46.8	<0.001
Giving ARV to the infants soon after delivery	248	27.1	24.3-30.1	41	18.6	13.7-24.4	0.025
Not breastfeeding the baby	587	64.2	61.0-67.3	106	48.2	41.4-55.0	<0.001
Exclusively breastfeed the baby	118	12.7	10.8-15.3	15	6.8	3.9-11.0	0.031

7.5.3 Factors associated with overall knowledge on HIV prevention, MTCT and PMTCT of HIV among pregnant women.

A percentage on the overall score on all three subjects (i.e. HIV prevention, MTCT and PMTCT) was obtained for each respondent and this was compared among women who received and those who did not receive ANC HIV education during the current pregnancy. Table 7-5 shows the crude and multivariable analysis comparing the mean overall knowledge among pregnant women.

The univariate analysis showed evidence of significant association in the mean overall knowledge for the following variables; receiving ANC HIV education during the current pregnancy ($p<0.001$), respondent's HIV status ($p<0.001$), respondent's age ($p<0.001$), education level ($p<0.001$), respondent's parity ($p=0.020$), respondent's occupation ($p<0.001$), respondent's religion ($p<0.001$), respondent's tribe ($p=0.002$) and whether the respondent had tested for HIV before the current pregnancy ($p<0.001$)

All variables in the univariate analysis were significant and there were all included in the multivariable analysis. It was found that after adjusting for all other variables knowledge decreased in women who did not receive ANC HIV education during the current pregnancy (adjusted difference=-3.8; 95% CI -5.7 -2.0, p<0.001), in women who were HIV-negative and those with unknown HIV status (adjusted difference=-2.1; 95% CI -4.6 0.2 and -5.2; 95% CI -7.9 -2.5,respectively p<0.001), in women with no formal education or those who attained primary education (adjusted difference=-3.9; 95% CI -5.8 -1.9, p=0.001) and in women who never had HIV test before the current pregnancy regardless of whether they were tested during the current pregnancy (adjusted difference=-2.3; 95% CI -3.6 -1.0, p<0.001).

In addition knowledge score increased in women of "other" tribes other than Sukuma women (adjusted difference=1.9, 95% CI 0.6 3.3; p=0.015) and in older women when compared with women aged below 20 years, however, there was a significant decrease in overall knowledge on HIV, MTCT and PMTCT among women who did not know their age (adjusted difference=-7. 2; 95% CI -14.0 -1.0, p=0.02).

On a multivariable analysis, there was no association between knowledge about HIV, MTCT and PMTCT and the participants' parity and occupation.

Table 7-5 Multiple linear regression models predicting mean score of HIV, MTCT and PMTCT knowledge among pregnant women.

		Crude analysis				Multivariable analysis			
Variable	Total n=1157	Mean	95%CI Lower	Upper	*p*	Adjusted difference[1]	95%CI Lower	Upper	*P*
Overall mean		49.2	45.8	52.5					
Received ANC HIV education									<0.001
Yes	931	44.5							
No	226	38.6	37.0	40.3		-3.8	-5.7	-2.0	
HIV status									<0.001
Positive	90	46.1							
Negative	829	44.2	41.9	46.7	<0.001	-2.1	-4.6	0.2	
Unknown	238	39.0	36.3	41.8		-5.2	-7.9	-2.5	
Age groups									0.019
< 20 years	193	40.4							
20-24 years	406	43.3	41.4	45.2		1.3	-0.6	3.1	
25-29 years	279	44.6	42.5	46.7		3.2	1.2	5.2	
30-35 years	173	44.8	42.5	47.1	<0.001	3.3	1.1	5.5	
≥ 35 years	94	43.9	41.1	46.1		2.9	0.2	5.6	
Unknown	12	32.9	26.3	39.5		-6.7	-13.0	-0.4	
Education level									<0.001
Secondary	183	47.7			<0.001	0.0			
Primary or none	974	42.5	40.8	44.3		-4.2	-5.9	-2.4	
Parity									0.133
Primigravidae	360	42.1			0.020	0.0			
Multigravidae	797	43.3	42.1	45.2		1.3	-0.4	3.0	
Occupation									0.317
House wives	552	42.9				0.0			
Unskilled work	558	43.1	41.8	44.5	<0.001	0.2	-1.1	1.4	
Skilled work	47	50.3	46.9	53.7		2.9	-0.6	6.5	
Religion									0.006
Roman Catholics	466	44.0				0.0			
Other Christians	410	42.1	40.7	43.7	<0.001	-2.0	-3.4	-0.6	
Muslims	269	44.4	42.7	46.1		-0.3	-1.9	1.4	
No religion	12	32.4	26.4	39.4		-7.2	-14.0	-1.0	
Tribe									0.061
Sukuma	424	41.9			0.002	0.0			
Other	733	44.1	42.7	45.4		1.9	0.6	3.2	
Ever tested for HIV before pregnancy									0.001
Yes	654	44.9			<0.001	0.0			
No	503	41.3		40.0 4		-2.3	-3.7	-1.1	

[1]Adjusted for age, HV status, education level, parity, occupation, religion, tribe whether have ever had and HIV test before,

7.6 Discussion

7.6.1 Observation of the ANC HIV education sessions

Generally, a reasonable length of time was spent on the ANC HIV education sessions when the woman attended ANC for the first time during the current pregnancy. It was found that women were not given an opportunity to introduce themselves to the group, although this would add time to busy clinic schedules. However, this may have reduced tension among participants and assisted in facilitating the discussion, since relatively low number of women answered or asked questions.

In addition, the findings that most women did not participate in the discussion might be due to the fact that they did not understand the talk or they were not interested in discussing issues around HIV/AIDS openly in a group especially if others might think that discussing issues around HIV/AIDS will prompt others to think that they were HIV-positive.

Some facilitators lacked information on HIV, MTCT and PMTCT and as a result, some important take-home messages for pregnant women were not either mentioned at all or were mentioned but not emphasised. This finding highlights an urgent need for training/refresher of health workers to equip them with updated information about HIV, MTCT and PMTCT.

We observed that women were not told that the HIV test during pregnancy was not mandatory and it was noted that women were denied services in the under-five clinics if their HIV status was unknown. In addition, statements such as "If you do not test HIV now, you will be tested during delivery because nobody will be willing to deliver you with unknown HIV status" were common during the ANC HIV education talks. This is contrary to the PMTCT National guidelines [37]. Women who test due to these circumstances might be more likely to fail to adhere to other PMTCT interventions since they take up the test but they might not understand the importance of other following interventions.

7.6.2 Cross-sectional study

In general, women who received ANC HIV education during the current pregnancy had a high knowledge of HIV, MTCT and PMTCT. After adjusting for other variables in the multivariable analysis, receiving ANC HIV education during the current pregnancy was strongly associated with

pregnant women's overall knowledge on HIV prevention, MTCT and PMTCT of HIV. It was also found that women who had a high score in knowledge about HIV, MTCT and PMTCT were more likely to have had an HIV test compared to those whose knowledge was low.

Pregnant women should be encouraged to attend to the ANC HIV education sessions and trained personnel should be made available in order have optimal results from these education talks and from the PMTCT program as a whole.

CHAPTER 8: REFERRAL AND CARE FOR HIV-POSITIVE PREGNANT WOMEN

8.1 Introduction

This chapter explores the referral system, uptake and attendance at a care and treatment clinic (CTC) among HIV-positive women tested for the first time during the current pregnancy. To address this aim data from the health worker interviews and from 403 HIV-positive women enrolled in a prospective cohort at admission for delivery at two large hospitals in Mwanza city were used. Before going into details of the results, an overview of the procedure that pregnant women attending CTC follows is given in section 8.2 Results from the health worker interviews will be covered in section 8.4 and results from the cohort study will be covered in section 8.6.

8.2 Procedure at the CTC

When HIV-positive pregnant women attend a CTC, a blood sample is taken for a confirmatory HIV test and CD4 cell count, before the pregnant women meets with a counsellor and a clinician. CD4 test results are typically not available on the same day; therefore, pregnant women are scheduled for a follow-up visit with a clinician to discuss clinical staging and the CD4 test results.

After consultation with a clinician at the follow up visit (CD4 test results should be available at this time), pregnant women eligible for and who agree to initiate therapy meet with a counsellor to discuss issues related to adherence, medication dosing and adverse event management. A blood sample is also taken for tests that help inform the treatment protocol and identify baseline values for monitoring toxicity. When they start taking the medication, pregnant women are scheduled for a follow-up visit after two weeks, then monthly for adherence counselling follow up and clinical care and monitoring of their response to therapy. After six months, they are requested to continue to visit the clinic once a month for adherence counselling and medication refills.

CD4 counts and basic blood tests are performed at six months intervals. Those who are not eligible for treatment require regular monitoring and assessment of clinical staging and CD4 count every 6 months.

8.3 Overview of the health worker interviews

The health worker interviews described in Chapter 4, section 5, provided data on the proportion of health workers who were involved in the implementation of PMTCT and who referred HIV-positive women identified through PMTCT for further services outside their facilities. Sites selected included two delivery suites and three ANC clinics that have PMTCT services. In addition, the health workers' data provided information on the referral system available at the health facilities, the reasons for referrals and the health workers' views on the current referral of HIV-positive pregnant women to a CTC and other services after an HIV-positive test at the ANC or at the maternity ward.

8.4 Findings from the health worker interviews

In total, 89 health workers were interviewed, 24 at Bugando Medical Centre (BMC), 33 at Sekou-Toure Regional Hospital (STRH), 13 at Makongoro Regional RCH clinic, 10 at Nyamagana District Hospital (NDH) and 9 at Igoma Health centre. Table 8-1 shows the cadre of the health workers that were interviewed at each health facility. The majority of the health workers interviewed were nurses (71.9%) followed by medical attendants (18.0%). Only three medical doctors were interviewed and all were at BMC.

Table 8-1 **Cadre of health workers participating in the study**

Formal training	Name of health facilities, n					
	All	BMC	STRH	Makongoro	NDH	Igoma
Medical Doctors	3	3	0	0	0	0
Clinical officers	3	0	0	1	1	1
Laboratory technicians	2	0	0	1	0	1
Pharmacy assistants	1	0	0	0	0	1
Medical attendants	16	3	7	4	1	1
Nurses	64	18	26	7	8	5
Total	89	24	33	13	10	9

8.4.1 Background information on PMTCT health workers

Since referral to HIV care and treatment centres is initiated at ANC services as well as at the maternity wards that offer PMTCT, background information on the training of PMTCT health workers was collected. Overall, 30 (33.7%) health workers who were interviewed reported that PMTCT implementation was their main daily work activity. All 30-health workers were females, trained as nurses, with a median age of 43 years (range 26-55 years).

Twenty-six (86.7%) health workers involved in the implementation of PMTCT reported receiving training in HIV testing, 25 (83.3%) reported receiving training in voluntary counselling and testing (VCT) and 22 (73.3%) reported receiving training in the provision of ARV prophylaxis for PMTCT. In addition, 25 (83.3%) reported receiving training in infant feeding counselling for HIV-positive women, 19 (63.3%) reported receiving training in optimal obstetric care, 20 (66.7%) reported receiving training in PMTCT record keeping and 22 (73.3%) reported to have received training in the national PMTCT guidelines of 2007. Table 8-2 shows the number and proportion of health workers who reported receiving training in different PMTCT subjects at each facility.

Table 8-2 Number and proportion of PMTCT health workers reporting training in different PMTCT subjects by health facilities

Facility name	BMC		STRH		Makongoro		NDH		Igoma		Total	
PMTCT health workers (N)	12		10		4		2		2		30	
Subject	No. trained (%)											
HIV testing	12	(100.0)	8	(80.0)	4	(100.0)	1	(50.0)	1	(50.0)	26	(86.7)
VCT for PMTCT	11	(91.8)	9	(90.0)	4	(100.0)	1	(50.0)	0	-	25	(83.3)
Provision of ARV for PMTCT	10	(83.3)	7	(70.0)	4	(100.0)	1	(50.0)	0	-	22	(73.3)
Infant feeding counselling	10	(83.3)	9	(90.0)	4	(100.0)	1	(50.0)	1	(50.0)	25	(83.3)
Optimal obstetric care	8	(66.7)	7	(70.0)	3	(75.0)	1	(50.0)	0	-	19	(63.3)
PMTCT record keeping	7	(58.4)	8	(80.0)	4	(100.0)	1	(50.0)	0	-	20	(66.7)
New PMTCT guidelines (2007)	10	(83.3)	6	(60.0)	4	(100.0)	0	-	2	(100.0)	22	(73.3)

Eighteen (66.7%) of the PMTCT health workers reported receiving training in 6 or 7 of the 7 PMTCT topics listed in Table 8-2 above. At Makongoro, three of four PMTCT health workers reported receiving training in all aspects of PMTCT (Table 8-3). One health worker at NDH reported not receiving any training in PMTCT at all though she was involved in the implementation of PMTCT as part of her daily activities.

Table 8-3 Training in PMTCT subjects among health workers at each health facility that participated in the health worker interviews

	Health Facilities											
	BMC		STRH		Makongoro		NDH		Igoma		Total	
PMTCT Health worker	12		10		4		2		2		30	
Number of PMTCT subjects	No. trained (%)											
None (zero)	0	-	0	-	0	-	1	50.0	0	-	1	3.3
1-2 subjects	1	(8.3)	1	(10.0)	0	-	0	-	2	100.0	4	13.3
3-5 subjects	2	(16.7)	3	(30.0)	0	-	0	-	0	-	5	16.7
6-7 subjects	9	(75.0)	6	(60.0)	4	100.0	1	50.0	0	-	18	66.7

8.4.2 Report on referral of HIV-positive women identified through PMTCT

Of the 30 health workers who were working on implementation of PMTCT, 21 (70.0%) reported giving referrals to HIV-positive women to attend services related to their HIV infection. The main referral reason that was mentioned by the health workers was to send women to CTC[12] facilities nearer their residential areas (57.1%). Other reasons for referral included initial referral to a CTC (from facilities that do not offer care and treatment services) (14.3%), referral for infant diagnosis (14.3%), for a CD4 test (9.5%) and to psychosocial support groups (4.8%).

Health workers were asked an open-ended question requiring them to describe the referral system that was in place. Nineteen of the 21 health workers mentioned using a specific referral form (Annex 6) that was given to the woman detailing her HIV status. This form should be completed when a woman is sent to another health facility for any service regarding her HIV status. However, it is most commonly completed during the HIV post-test counselling session when the woman is provided with information about all available interventions and the facilities that offer those interventions and she is given an opportunity to choose a facility that is convenient for her. When the woman attends the referral facility, the health worker at the new facility completes section B of the referral form to show that the woman has attended and the type of services that she received at the facility. Section B is given back to the woman who is then supposed to take it back to the original ANC facility where she was tested for HIV. This process was clearly described by all the health workers who reported giving referrals to HIV-positive women.

According to the national PMTCT guidelines, HIV-positive women identified through PMTCT should be referred for assessment of eligibility for ART treatment as soon as possible after a positive HIV test [37]. Assessment for eligibility for ARV treatment is then done at a CTC. However, few of the PMTCT health workers interviewed did not know the appropriate timing of referrals to CTC for HIV-positive women identified through PMTCT. One health worker at Igoma RCH clinic said

> "The woman has to come back to the under-five clinic 6 weeks after delivery and she is given a letter (referral form) to be submitted to a CTC at STRH".

[12] Following the introduction of more CTCs, women were referred to their local CTC facilities.

In addition, one of the PMTCT counsellors at NDH said

> "...When we find that the woman is HIV-positive, if her pregnancy is above 28 weeks, we give her a tablet to keep and we instruct her to use the tablet when labour pain starts. We normally ask these women to come to the clinic after delivery and it is when we give them a referral letter to take to the CTC where they get more services..."

This is clearly contrary to the PMTCT guidelines that emphasise the importance of the assessment for the eligibility for ARV treatment that is normally done at the CTC [37].

8.4.3 Challenges of the referral system

PMTCT health workers who participated in the interview reported the following weaknesses and problems in the referral system:-

1. Lack of coordination between ANC clinics and CTCs, which result in HIV-positive pregnant women failing to attend a CTC. This was perceived to be due to lack of tracking system as women moved from the ANC to a CTC. It was suggested that this could be done if ANC health workers accompanied women to a CTC. In addition, health workers at the ANC often did not know whether HIV-positive pregnant women referred to CTC actually attended a CTC before or after delivery because most referred women do not bring Section B of the referral form back to the ANC.
2. Pregnant women attending a CTC have to go through the same normal procedures as other new non-pregnant HIV-positive individuals, which cause delay in accessing CTC services pre delivery.
3. Pregnant women do not attend CTCs when they are referred because they are not sick and some of them do not understand the importance of attending before delivery.

One health worker at BMC reported that women referred to a CTC from an ANC or from the maternity ward are sometimes being sent back by the health workers at CTC to the maternity ward PMTCT section without being enrolled at a CTC and therefore do not get assessed for eligibility for ARV treatment during pregnancy. This is because some health workers at a CTC assumed that HIV–positive pregnant women should receive all the care they needed at the PMTCT section in the ANC or in the maternity ward.

There was also a concern that HIV-positive women identified through PMTCT services are being sent to CTC facilities that are already overloaded. As a result, they do not get enrolled at the CTC

or assessed for eligibility to ARV treatment during pregnancy because of a high number of patients waiting for the same service. A nurse from BMC stated

> "We are sending them to these facilities so that they can get better services, yet these facilities have so many clients and therefore these women do not get the required services."

8.5 Overview of the cohort study

The proportion of women who were referred to a CTC following an HIV-positive test at PMTCT screening was obtained from 403 HIV-positive women enrolled in a prospective cohort at admission for delivery at two large hospitals in Mwanza city.

All women tested for HIV during the current pregnancy, either at ANC or at the maternity ward when they were admitted for delivery, were asked if they were referred to a CTC following a positive HIV test. This was part of the interview at cohort recruitment and at each of the monthly follow-up visits for 4-months post-delivery. Women, who reported any written or oral referral, were then asked if they actually attended the CTC. Women reporting attendance at a CTC were asked to show the interviewer their CTC card. The CTC card has recorded information on: - date of attendance, CD4 counts, date of CD4 counts, whether the woman was started on HAART following the CD4 test results and the date of initiation of ARV treatment.

8.6 Findings from the cohort study

Ninety-three women who tested HIV-positive before the current pregnancy were excluded from this analysis. Three hundred and ten (76.9%) of 403 HIV-positive women in the cohort were tested for HIV during or just after the current pregnancy. Of these 240 (77.4%) were tested at ANC, 23 (7.4%) were tested at the maternity ward before delivery and 47 (15.6%) were tested at the maternity ward after delivery.

8.6.1 Referral to CTC among cohort women attended ANC at clinics that participated in the health worker interviews.

Ninety-three (38.8%) HIV-positive pregnant women out of 240 women, who tested for HIV at ANC during the current pregnancy and were recruited into the cohort, attended ANC at Makongoro, NDH and Igoma health centre. These are the ANC facilities that participated in the health worker interviews. In order to confirm the findings reported in section 8.3.2 regarding the

misunderstanding of the referral timing that was revealed by the health worker at NDH ANC clinic, the cohort study data were examined.

It was found that all 16 HIV-positive women in the cohort study who attended the ANC at NDH were not given any referral to CTC before delivery (Table 8-4). Thirty-four women out of 51 (66.7%) and 13 out 26 (50.0%) who attended ANC at Makongoro and Igoma RCH clinics reported receiving a referral to CTC before delivery (Table 8-4).

Table 8-4 Cohort data indicating reported referral to CTC before delivery among HIV-positive pregnant women attending ANC at Makongoro NDH and Igoma RCH clinics

	ANC facility name			
	Makongoro	NDH	Igoma	Total
Total in the cohort at recruitment	51	16	26	93
Number reported receiving referral at ANC	34	0	13	47
Proportion receiving referral at ANC	66.7%	0	50.0%	50.5%

8.6.2 Proportion of women referred to CTC

Overall, 123 (51.3%) of 240 pregnant women identified as HIV-positive during or just after the current pregnancy at ANC reported receiving referral to a CTC before delivery. In addition, 70 (22.6%) of 310 women who were identified as HIV-positive at the maternity ward did not receive referral to CTC before discharge from the maternity ward.

Table 8-5 shows the number of women who were seen at each follow-up visit and the proportion who received referral to a CTC before or after delivery. At each follow-up visit though the number of women seen was declining, the number of women reporting referral to CTC after delivery increased from 37 women at one month post-delivery to 98 women 4 months after delivery, this means that women who continued seeking health services were eventually referred to a CTC post-delivery.

Table 8-5 Referral to CTC before and after delivery

Follow up visit	Total number seen (%) N=310[1]	Received referral to CTC		
		Pre-delivery	Post-delivery	Total
Month 1	271 (87.4)	111	37	148 (54.6)
Month 2	245 (79.0)	103	48	151 (61.6)
Month 3	233 (75.2)	100	53	153 (65.7)
Month 4	244 (79.0)	102	97	199 (81.6)

[1] Women identified as HIV-positive for the first time through PMTCT HIV screening

Two hundred and seventy-one (87.4%), 245 (78.0%) and 233 (75.2%) of 310 women who were identified as HIV-positive through PMTCT HIV screening during the current pregnancy were seen at first, second and third follow-up visits respectively. Of these, 148 (54.6%), 151 (61.6%) and 153 (65.7%) reported receiving referral to a CTC before or after delivery when they were see at first, second and third follow-up visits respectively.

Of the 310 women who were identified as HIV-positive during or just after the current pregnancy, 244 (79.0%) were seen during the fourth month post-delivery follow-up visit. Of these, 199 (81.6%) reported receiving referral to a CTC. These included 102 (82.9%) women out of 123 women who received referral before delivery and 97 women who received referral when they attended the under-five clinics or when they visited the maternity wards for infant diagnosis[13].

8.6.3 Proportion of women attending a CTC pre and post-delivery

8.6.3.1 *Information at cohort recruitment*

Among 123 HIV-positive women who were tested at ANC and who were referred to a CTC before delivery, 85 (69.1%) reported having attended a CTC before delivery. Of the 85 women reported attending a CTC before delivery, 36 (42.3%) confirmed the attendance at a CTC by providing a CTC card at cohort recruitment. Forty-nine (57.7%) women who reported attending to a CTC before

[13] At the maternity ward before discharge from the hospital after delivery, HIV-positive women who were counselled were advised on the importance of knowing the HIV status of their infants and they were asked to bring them to the maternity ward 4 weeks later so that a blood sample for the infant diagnosis (HIV DNA and RNA PCR) could be collected.

delivery and who did not provide their CTC card at cohort recruitment were seen at least once during the follow-up visits and from information collected at follow up visit by examining their CTC card it was found that in reality 71 (57.7%) women out of 123 had attended to CTC before delivery, 12 (9.8%) attended after delivery, 28 (22.8%) did not attend to CTC and 12 (9.8%) were lost to follow up before attending a CTC, therefore it is not known if they attended a CTC or not.

8.6.3.2 *Attendance to a CTC during the follow-up visits*

Table 8-6 shows the number of HIV-positive women who were seen at each follow-up visit, the number who reported receiving referral to a CTC and the number and proportion of those who attended a CTC before or after delivery.

Table 8-6 Attendance to a CTC before and after delivery

Follow up visit	Total number seen (%) N=310[1]	Total number referred to a CTC	Attended a CTC		
			Pre-delivery[2]	Post-delivery	Total
Month 1	271 (87.4)	148	60	8	68 (45.9)
Month 2	245 (79.0)	151	68	23	91 (60.3)
Month 3	233 (75.2)	153	72	32	104 (68.0)
Month 4	244 (79.0)	199	74	49	123 (61.8)

[1] Women identified as HIV-positive for the first time through PMTCT HIV screening
[2] This includes women who made a self-referral to a CTC but who were referred to CTC after delivery who are not among 71 (at cohort recruitment)

At the first follow-up visit, 68 (45.9%) of 148 women who reported receiving referral to a CTC had attended to a CTC. Of these 68 women, 60 had attended a CTC before delivery and 8 attended after delivery. During the second follow-up visit, the number of women reporting to have attended to a CTC increased to 91 (60.3%) out of 151 women who received referral to a CTC. Of these 91, 68 attended a CTC before delivery and 23 attended a CTC after delivery. Similarly for the third follow-up visit 104 (68.0%) of 153 women who received referral to a CTC had attended to a CTC, 72 attended before delivery and 32 attended after delivery. Finally, at the 4th follow-up visit, 123 (61.8%) of 199 women who reported receiving referral to a CTC had attended to a CTC, of these, 74 attended to a CTC before delivery and 49 attended to a CTC after delivery. As expected, the number of women attending a CTC after delivery increased from 8 at the 1st follow-up visit to 49 at the 4th follow-up visit.

It is also important to note that 11 (5.9%) of 187 women who reported not receiving referral to CTC at cohort recruitment, made a self referral to a CTC and attended a CTC before or after delivery[14]. However, these women reported to have received a referral to a CTC at some point during the follow-up visit, therefore, for these women referral was done after attending a CTC and as a result we have more women attending a CTC before delivery during the follow-up visit compared to the number at cohort recruitment. (This is because initially we only considered those who reported to have received any referral (oral or written) from the health worker).

8.6.4 Proportion of women having a CD4 count test done

During the cohort recruitment and at each follow-up visits, women who reported to have attended to a CTC were asked to show their CTC card to the interviewer so as to record the information on services that the woman received at a CTC. However, other women did not bring their CTC card at the maternity ward when they were admitted for delivery. Women were asked to bring their CTC card at the follow-up visit, but still some women were not able to bring their CTC cards. Table 8-7 shows the number of women who reported attending a CTC; the number who had a CTC card and the number whose CD4 count test results was shown in their CTC card at cohort recruitment and at the follow-up visit. Cumulatively, 94 women had CD4 test done and among these, nine (9.6%) had a repeat CD4 test done and indicated on their CTC card. Therefore, for women with CD4 results at recruitment, this was shown as having had CD4 count at all subsequent visits and most of them had one CD4 test result on their CTC cards because they were not yet eligible for a repeat test during the study period (i.e. they had had their first CD4 test for less than six months)

During the cohort recruitment, 71 women had attended a CTC, 36 women brought their CTC card at the maternity ward when they were admitted for delivery, of those, 30 (83.3%) had a CD4 test done and indicated on a CTC card (Table 8-7).

During the 1st, 2nd, 3rd and 4th follow-up visits the information on CD4 count test were obtained for 63, 74, 79 and 101 women respectively. Of these, 42 (66.7%), 48 (64.9%), 53 (67.1%) and 78

[14] Ten attended a CTC before delivery and 1 attended after delivery; However, all of them reported being referred to a CTC after they had actually attended following a self referral.

(77.2%) had CD4 count test done and CD4 counts were indicated on their CTC cards that were reviewed during the 1st , 2nd, 3rd and 4th follow-up visit respectively (Table 8-7)

Table 8-7 CD4 count test done and indicated on a CTC card

Visit	Total number attended a CTC	Total number of CTC card seen (%)	Total number with CD4 test results (%)
Cohort recruitment	71	36 (50.7)	30 (83.3)
Month 1 follow-up	68	63 (92.6)	42 (66.7)
Month 2 follow-up	91	74 (81.3)	48 (64.9)
Month 3 follow-up	104	79 (76.0)	53 (67.1)
Month 4 follow-up	123	98 (79.7)	78 (79.6)

Among the 30, 42, 48,53 and 78 women who attended a CTC and who had a CD4 count test done and indicated on the participants' CTC cards at cohort recruitment, 1st , 2nd , 3rd and 4th follow-up visits, 5 (16.7%), 10 (23.3%), 8 (16.7), 12 (22.2) and 18 (22.5%) women respectively had CD4 count of less than 200 cells/mm^3. Among those 5, 10, 8, 12 and 18 women with CD4 less than 200cell.mm^3 and whose CTC card were seen during the respective visits, 3 (60.0%), 5 (50.0%), 4 (50.0%), 7 (58.3%) and 10 (55.6%) respectively were started on HAART (Table 8-8).

Table 8-8 CD4 count less than 200 cells/mm3 and initiation to HAART

Visit	Total number with CD4 test results (%)	Total number CD4 count >200 cells/mm^3	Total number CD4 count ≤200 cells/mm^3	Total number started on HAART (%)
Cohort recruitment	30	25	5	3 (60.0)
Month 1 follow-up	42	32	10	5 (50.0)
Month 2 follow-up	48	40	8	4 (50.0)
Month 3 follow-up	53	41	12	7 (58.3)
Month 4 follow-up	78	60	18	10 (55.6)

8.7 Piot Fransen model of completion of referral and CTC attendance steps

Using the cohort data, a model was built up to show the fall-off at each step of the referral system using women who tested HIV-positive for the first time during the current pregnancy and who were seen at the 4th follow-up visit. The use of women seen at the 4th follow-up visit will allow for the inclusion of women who have complete information up to the end of the study.

8.7.1 Selection of women to include in the model

Figure 8-1 shows the number of pregnant women who were seen during the 4th follow up visit and those who were lost to follow up (LTFU) before the 4th follow up visit. In total 66 (21.5%) out of 310 who were identified as HIV-positive for the first time through PMTCT HIV screening were not seen during the 4th follow up visit, these included 39 women who prior to LTFU had reported have not received any referral to a CTC and 27 who had reported receiving referral to a CTC. Among 27 women who reported receiving referral to a CTC before LTFU, 10 had actually attended a CTC before LTFU. However, what happened to these women after LTFU regarding their referral to a CTC is not known, therefore all 66 women are excluded from this analysis.

For the 244 women who were seen at the end of the four month post delivery follow-up visit, 45 (18.4%) reported that they did not receive any referral to a CTC since when they were tested up to four month post delivery. Thesé 45 women included 20 (8.3%) women out of 240 HIV-positive women who tested HIV-positive for the first time when they attended the ANC during or just after the current pregnancy and 25 (35.7%) women out of 70 HIV-positive women who tested HIV-positive for the first time at the maternity ward when they were admitted for delivery and tested before or after delivery.

One hundred and ninety-nine (81.6%) of 244 women who were seen at the end of four month follow up had been referred to a CTC before or after delivery. Among these 199 women, 123 (61.8%) reported to have attended a CTC by the end of the four month follow-up visit. However, CTC card for 13 (10.6%) women out of 123 who reported attending a CTC were not seen for the entire period of the study and therefore it was not known if they actually attended a CTC and therefore these are removed from the denominator for women who had CD4 count test done (i.e. the denominator will be 123-13=110 women whose CTC card were seen)

Seventy-eight (70.9%) women out of 110 whose CTC cards were seen at least once during the follow-up visit had their CD4 count test done and clearly indicate in their cards. Of these, 18 had a CD4 count of less or equal to 200 cell/mm^3 and 10 of them were started on HAART before delivery or within the four-month period post delivery.

Figure 8-1 Women with data up the fourth follow-up visit who are included in the Piot's Fransen model

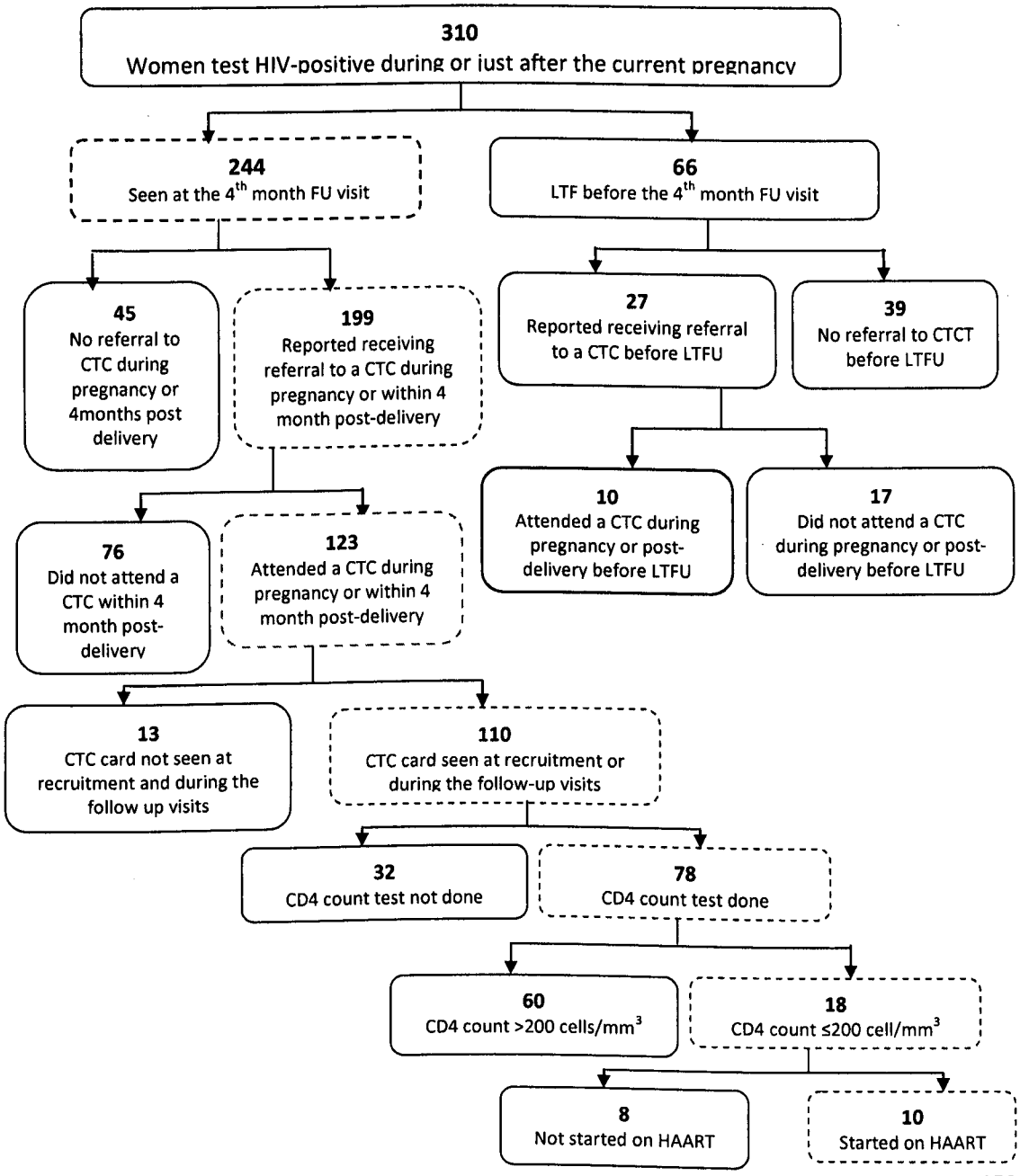


Table 8-9 is the summary of Figure 8-1 above that explains the number and denominators for each of the proportions that are in the model.

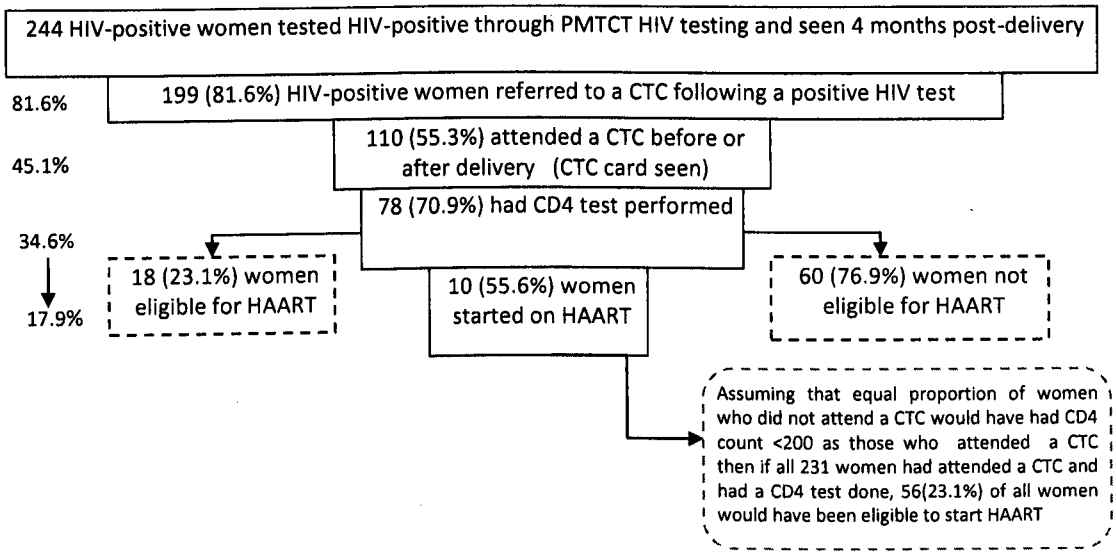
Table 8-9 Number and proportion for the Piot's Fransen model of referral and attendance to a CTC

Service	Description of the denominator	Number	Number (%) receiving the service	Overall proportion
Referral to CTC	All women who were seen at 4th follow-up visit	244	199(81.6)	$\frac{199}{244}$ (81.6%)
Attend to a CTC	All women seen at 4th follow up visit and referred to a CTC	199	110 (55.3)	$\frac{110}{244}$ (45.1%)
CD4 count test done	Women attended a CTC and who had a CTC card	110	78 (70.9)	$\frac{78}{231}$ (34.6%)
Started on HAART	Women with CD4 count less than 200 cell/mm^3	18	10 (55.6)	$\frac{10}{56}$ (17.9%)[1]

[1] Assuming that equal proportion of women who did not attend a CTC would have had CD4 count <200 as those who attended a CTC then if all 244 women had attended a CTC and had a CD4 test done, 56 (23.1%) of all women would have been eligible to start HAART

Figure 8-2 shows the model of referral and uptake of care among HIV-positive women who are identified through PMTCT screening. This figure is a summary of the information described in Figure 8-1 and Table 8-9. Overall, 17.9% of HIV-positive women identified through PMTCT were referred to a CTC and received care for their own health before delivery or within the four months post-partum period. (i.e. 17.9% of HIV-positive women in our cohort who tested HIV-positive during the PMTCT screening were started on HAART during pregnancy or within 4 months post-delivery)

Figure 8-2 **Proportion of HIV-positive women identified through PMTCT who were referred and attended to CTC**



8.8 Discussion

8.8.1 Key findings from the health worker interviews

From the interviews, we found that a high proportion of health workers participating in the implementation of PMTCT received training in basic components of PMTCT. However, this finding was not consistent at all the facilities participating in the study. More health workers at Makongoro RCH clinic reported to have received training in PMTCT basic components compared to health workers at NDH and Igoma RCH clinics. Makongoro clinic was one of the five national PMTCT pilot sites in 2000 and a pilot site for the infant diagnosis procedure that was done by ICAP TZ in 2006. These two pilot studies increased the exposure to PMTCT training among staff at Makongoro clinic and it might explain the observed differences.

The majority of health workers were aware of the HIV referral system. Nevertheless there were misunderstandings concerning when women identified through PMTCT should be referred to CTC. This resulted in a missed opportunity for referral during pregnancy to a CTC among all HIV-positive women who attended the ANC at NDH. This finding suggests a need for sustained training

of health workers and that close supervision is needed with checks on the specific information that is being given by the health workers to women who test HIV-positive during pregnancy. In addition, there is a need to standardize important messages that are delivered by health workers during post-test HIV counselling to address interventions available to women after a positive HIV test.

Health workers pointed out some weaknesses of the current referral system and a need for a system that will allow coordination between ANCs and CTCs to minimize the number of women who fail to attend a CTC before delivery. Health workers suggested there was a need for a designated CTC for pregnant women to make it possible for them to be assessed for eligibility to ARV treatment before delivery, which is not always possible when attending currently overbooked CTCs.

8.8.2 Key findings from the cohort study

8.8.2.1 *Referral to CTC*

Only 51.3% of HIV-positive women who were tested at ANC during the current pregnancy were referred to a CTC before delivery. The fact that some health workers did not know that women should be referred to a CTC as soon as possible after being given their HIV results probably contributed to this low referral rate. Refresher training among health workers is of importance as some might not be aware of the new development in the management of HIV during pregnancy that has been happening recently.

None of the HIV-positive women tested at the maternity ward received a referral to a CTC before discharge from the hospital after delivery. At discharge all HIV-positive women who had babies were asked to bring them for infant diagnosis after 28 days (4 weeks). Only 40.0% of women tested at the maternity ward reported to have received referral when they attended to the under-five clinic or when they went back to the hospital maternity wards for infant diagnosis. This means that women who did not have an opportunity to come again to the maternity ward for the infant diagnosis (one month after delivery) and those who did not attend under-five clinics that offer on-going counselling to HIV-positive women did not get referral to a CTC. Again this finding suggests a need of strengthening PMTCT in the maternity suites to allow for enough time for

counselling so that HIV-positive women receives information on available important interventions regarding their HIV-positive status before discharge from the labour ward.

8.8.2.2 *Attendance at a CTC*

Another fall off in the model of completion of referral and CTC attendance occurs between referral and attendance at the CTC. This may be due to individual factors such as fear of disclosing their HIV status and fear about using ARV. Other reasons for this were mentioned by health workers. These included the perceived lack of coordination between ANC clinics and CTC and also the fact that women have to go through all the CTC procedures like other non-pregnant HIV-positive individuals.

Interestingly for those who attended a CTC, about 70% had their CD4 test done before or after delivery. This is a good sign of service availability for those who attend a CTC. However, this needs to be backed-up with a strong system that will inform HIV-positive women on the importance of referral uptake and a system that will help them get to a CTC and benefit from the available services. This could be achieved by promoting a supermarket approach in the health facilities that will allow having all the services under one roof, or where this is not possible, then an accompanied referral. Only 30.0% of HIV-positive women identified through PMTCT who were assessed and found to be eligible for HAART were started on HAART before delivery. This proportion might be improved by increasing the number of women who access CTC services as soon as possible after the HIV-positive test as suggested above.

Overall, a small proportion (17.9%) of HIV pregnant women identified through PMTCT was successfully taken through the referral system to attend an adult HIV care and treatment centre. This finding prompts an urgent need for a more integrated system that will allow HIV-positive women to receive the services that they require for their own health as soon as possible after being identified as HIV-positive.

CHAPTER 9: FAMILY PLANNING UPTAKE AMONG HIV-POSITIVE WOMEN

9.1 Introduction

Family planning (FP) use among HIV-positive women can help to prevent future unwanted pregnancies and thus reduce the number of HIV–infected babies. It is recommended in the national PMTCT guidelines[37] that HIV-positive women should be counseled on FP use during the postpartum period. This chapter documents the use of FP among HIV-positive women prior to the current pregnancy, the proportion of HIV-positive women receiving counseling on FP use and the proportion of HIV-positive women using FP after delivery. The role FP counseling on uptake of FP after delivery was also investigated. For the purpose of this study, the FP methods that were considered included oral pills, injectable hormonal contraception, male or female condoms, calendar or safe period, the intrauterine contraceptive device (IUCD), traditional medicines, withdrawal method and norplant or other implants.

Data were obtained from 403 HIV-positive women enrolled in a prospective cohort study at admission for delivery at two large hospitals in Mwanza City. These women had tested HIV-positive for the first time either before their current pregnancies or during the current pregnancies at the antenatal care (ANC) clinic or at the maternity ward when they were admitted and tested before or after delivery.

Information on whether or not the current pregnancy was planned and if there was use of contraceptives prior to this current pregnancy was collected from all participants during the cohort recruitment. This information was used to estimate the unmet need for FP use among HIV-positive women. Unmet need for FP use was defined as the proportion of HIV-positive women who were not intending to become pregnant and who were not using any contraception prior to this current pregnancy. In addition, information collected during the cohort recruitment was used to determine the proportion of HIV-positive women who experienced FP method failure (i.e. the proportion of women who did not intend to become pregnant but became pregnant even though they reported using some form of contraceptive prior to the current pregnancy).

FP use prior to the current pregnancy, unmet need for FP use and FP method failure was compared among women who tested HIV-positive prior to the current pregnancy and those who tested for HIV during the current pregnancy.

Women recruited into the cohort were followed up monthly for 4 months post-delivery. At each follow up visit women were asked if they had ever received FP counselling after delivery and if they were currently using any form of FP method. If so, women were asked to describe all FP methods that they had used prior to the current pregnancy and after delivery. Information was also collected on reasons for not using FP methods. Factors associated with failure to uptake FP post-partum were determined.

9.2 Family planning use prior to the current pregnancy

Of the 403 HIV-positive women recruited in a cohort study, 208 (51.6%) reported to had ever used FP before, out of whom, 189 (90.9%) reported using FP prior to this current pregnancy. Twenty-nine (15.4%) women reported using more than one FP methods prior to this current pregnancy.

9.2.1 Proportion of HIV-positive women using FP prior to the current pregnancy

A higher proportion of HIV-positive women tested before the current pregnancy reported to have had ever used FP methods compared to women who tested HIV-positive during the current pregnancy (p=0.033). Differences in the use of FP prior to the current pregnancy between HIV-positive women who tested before the current pregnancy and those who tested during the current pregnancy were non-significant (Table 9-1).

At cohort recruitment, 342 (84.9%) of 403 HIV-positive women reported an intention to use FP after delivery. These included 151 women out of 195 (77.4%) who reported to have never used FP before. Of these 151 women, 118 (74.2%) were women who tested HIV-positive during the current pregnancy and 33 (91.7%) were women who tested HIV-positive before the current pregnancy (Table 9-1). A significantly high proportion of women who tested for HIV before the current pregnancy reported an intention to use FP methods after delivery compared to women who tested for HIV during the current pregnancy (p=0.024).

Table 9-1 Family planning methods used prior to the current pregnancy by timing of the HIV test.

Variables	Total N=403	Timing of the HIV-positive test: Before current pregnancy (n=93) n	%	During current pregnancy (n=310) n	%	p
Ever used FP						
Yes	208	57	61.3	151	48.7	0.033
No	195	36	38.7	159	21.3	
Used FP prior to the current pregnancy[1]						
Yes	189	49	86.0	140	92.7	0.132
No	19	8	14.0	11	7.3	
Intending to use FP after delivery[2]						
Yes	151	33	91.7	118	74.2	0.024
No	44	3	8.3	41	25.8	

[1] Only those reporting to have ever used FP before (n=208)

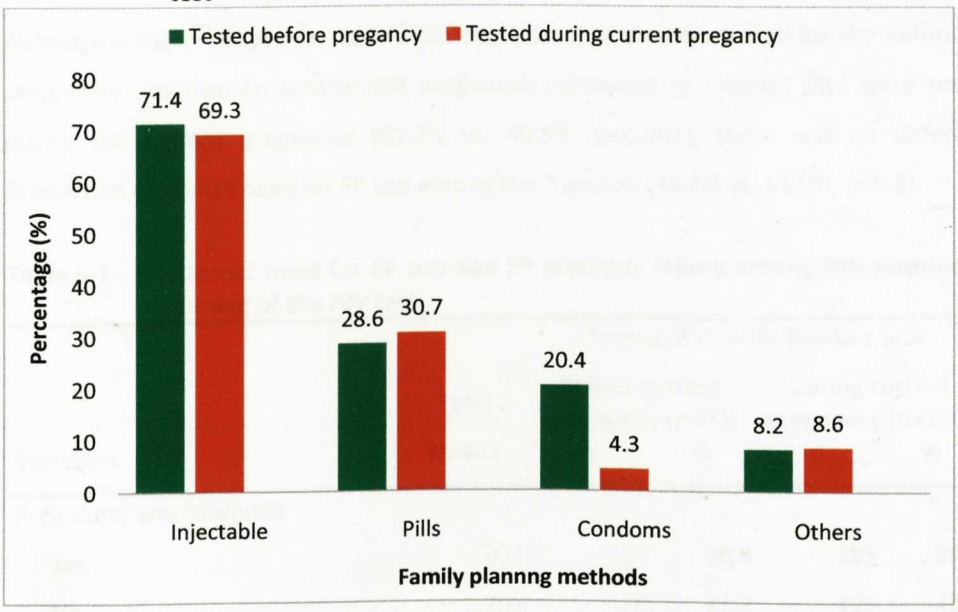
[2] Only those who have never used FP before (n=195)

9.2.2 Family planning methods used prior to the current pregnancy

The most frequent FP method that was used by HIV-positive women prior to the current pregnancy was injectable hormonal contraception (Depo-Provera (medroxyprogesterone acetate), which contains enough Progestin to prevent pregnancy for three months). This method was reported to have been used by 132 (69.8%), followed by oral contraceptive pills reported by 57 (30.2%) of HIV-positive women. Use of condoms was reported by 16 (8.5%) of the HIV-positive women. Other methods including IUCD, implant, traditional methods, the withdrawal methods and use of safe days were reported by 16 (8.5%) women.

Figure 9-1 shows the proportion of women who reported using various FP methods among women who were tested for HIV before the current pregnancy and those who were tested for HIV during the current pregnancy. A similar proportion of women who tested for HIV before the current pregnancy and those who tested during the current pregnancy reported using injectable contraception (71.4% vs. 69.3%; p=0.778), pills (28.6% vs. 30.7%; p=0.778) and other methods (8.2% vs. 8.6%; p=0.833).

Figure 9-1 Contraceptive methods used prior to the current pregnancy by timing of the HIV test



Of the 16 HIV-positive women who reported to have used condoms as a FP method prior to the current pregnancy, 10 (62.5%) were women who tested HIV-positive before the current pregnancy. Women who tested HIV-positive prior to the current pregnancy were more likely to report to have used condoms as a FP method compared to women who tested HIV-positive during the current pregnancy (20.4% vs.4.3%; p<0.001)

9.2.3 Unmet need for FP use among HIV-positive women

Overall, 201 (49.9%) of all HIV-positive women recruited into the cohort study reported that the current pregnancy was not intended/planned. A significantly higher proportion of women who were tested for HIV before the current pregnancy reported that the current pregnancy was not intended compared to women who were tested for HIV during the current pregnancy (81.7% vs.40.3%; p<0.001) (Table 9-2).

Among 201 HIV-positive women who reported unintended pregnancy 99 (49.3%) were not using any form of FP method prior to the current pregnancy. These included 58 (46.4%) of 125 women

who tested HIV-positive during the current pregnancy and 41 (53.9%) of 76 women who were tested HIV-positive before the current pregnancy.

Although a higher proportion of HIV-positive women who were tested for HIV before the current pregnancy reported an unintended pregnancy compared to women who were tested for HIV during the current pregnancy (81.7% vs. 40.3%, p<0.001), there was no difference in the proportion of unmet need for FP use among the 2 groups (46.4% vs. 53.9%; p=0.3).

Table 9-2 Unmet need for FP use and FP methods failure among HIV-positive women by timing of the HIV test.

		Timing of the HIV-positive test				
	Total	Before current pregnancy (n=93)		During current pregnancy (n=310)		
Variables	N=403	n	%	n	%	p
Pregnancy was intended						
Yes	202	17	18.3	185	59.7	<0.001
No	201	76	81.7	125	40.3	
Unmet need for FP use[1,2]	99	41	53.9	58	46.4	0.3
FP method failure[3]	102	35	46.1	67	53.6	0.3

[1]Denominator is the number of women reporting unintended current pregnancy (n=201; 76 tested before pregnancy and 125 tested during current pregnancy)

[2]Women who were not intending to become pregnant and who were not using any contraception prior to this pregnancy.

[3]Denominator is the number of women reporting unintended current pregnancy (Women who did not intend to become pregnant and who reported using contraceptive prior to the current pregnancy)

9.2.4 Family planning method failure among HIV-positive women

Of the 210 HIV-positive women who reported unintended pregnancies, 102 (50.7%) reported that they were using contraceptives for FP before the current pregnancy and these women were considered to have experienced FP method failure. Among 102 who experienced FP method failure, 67 (53.6) had tested HIV-positive for the first time during the current pregnancy and 35 (46.1%) had tested HIV-positive prior to the current pregnancy (p=0.3).

FP method failure occurred among 32/59 (56.1%) women who reported using oral pills, 72/132 (54.5%) women who reported using injectable contraception, 11/16 (68.6%) women who reported using condoms and 6/12 (50.0%) of women who reported using other contraception methods.

9.3 Family planning counseling and use among HIV-positive women after delivery

Overall, 367 (91.1%) of the 403 HIV-positive women in the cohort were seen at least once during the four follow up visits post-delivery. Of these, 287 (78.2%) reported receiving counseling on FP after delivery and within the four months after delivery. Of the 403 women who were recruited into the cohort study, 360 (89.3%), 330 (81.9%), 316 (78.4%) and 328 (81.4%) were seen at first, second, third and fourth monthly follow-up visits respectively.

9.3.1 Reported FP counseling and use during follow up visits

Table 9-3 shows the number and proportion of HIV-positive women seen during each follow-up visit who reported receiving counseling on FP use and who were using FP after delivery. Women were asked if there were using any family planning method regardless of whether they received counseling on FP use after delivery or not.

During the first month follow up visit, 360 HIV-positive women were seen, of those 217 (60.7%) reported to have been counselled on FP use after delivery[15] and 19 (5.3%) of women seen one month post-delivery reported the use of FP. Of the 19 women reporting the use of FP, 10 (52.6%) were using condoms and one woman reported using condom and another FP method (dual protection).

Three hundred and thirty women were seen at two months post-delivery, of whom 242 (73.3%) reported to have received counseling on FP use and 70 (21.1%) reported that they were using FP. Among 70 women reporting using FP, 44 (62.9%) reported using condoms and only one woman reported using condom and another FP method (Table 9-3).

[15] This included whether they were counselled at the maternity ward after delivery before discharge or if they received counselling on FP use when they visited any of the health facilities for services regarding their HIV-positive status i.e. CTC's, maternity ward/under-five clinic for infant diagnosis etc.

Table 9-3 Post-delivery FP counselling and uptake among HIV-positive women.

	Follow up visit							
	1-month		2-months		3-months		4-months	
# of women seen at each visit (N)	360		330		316		328	
	n	%	n	%	n	%	n	%
Counseling on FP								
Yes	217	60.3	242	73.3	237	75.0	259	79.0
No	143	39.7	88	26.7	79	25.0	69	21.0
Using FP[1]								
Yes	19	5.3	70	21.2	103	32.6	140	42.7
No	341	94.7	260	78.8	213	67.4	188	57.3

[1] All women regardless of whether they were counselled or not

Similarly, at the third month follow-up visit, 316 women were seen, 237 (75.0%) reported receiving counseling on FP use but only 103 of 316 (32.6%) reported using FP. Among these 103 women who reported the use of FP, 66 (64.1%) reported using condoms. Only 2 women reported using condoms and another FP method (Table 9-4).

In total 328 women were seen during the last follow-up visit (four months post-delivery). Of these, 259 (79.0%) reported receiving counseling on FP use and 140 (42.7%) reported using FP. Eighty-eight (62.9%) of those reporting using FP were using condom, and 6 women reported using condom and another method.

Table 9-4 FP methods that were used by HIV-positive women after delivery.

# of women seen at each visit (N)	Follow up visit							
	1-month 360		2-months 330		3-months 316		4-months 328	
	n	%	n	%	n	%	n	%
Women using FP	19	5.3	70	21.2	103	32.6	140	42.7
FP methods[1]								
Oral pills	4	21.1	8	11.4	9	8.7	14	10.0
Injection	3	15.8	13	18.6	23	22.3	32	22.9
Condoms	10	52.6	44	62.9	66	64.1	88	62.9
Others[2]	4	21.1	5	7.1	7	6.8	12	8.6
Using dual protection[3]	1	5.3	1	1.4	2	1.9	6	4.3

[1] Denominator is women reporting using FP and some women mentioned more than one FP method.

[2] Other FP methods included IUCD, implants, traditional methods, withdrawal, safe periods and sterilization.

[3] Using condoms and another FP method.

9.3.2 Reasons for not using FP after delivery among HIV-positive women

Reasons for not using FP were investigated during the interview at each visit. The majority of these women indicated that they had not resumed sexual intercourse after delivery.

Table 9-5 shows the number and proportion of women who reported various reasons for not using FP methods post-delivery. These included the belief that they could not get pregnant while breastfeeding, a need to discuss FP with their husbands and that their husbands had refused them to use FP. A small proportion (3-4%) of those not using contraception believed that contraception was not safe and could cause cancer and infertility

Table 9-5 Reasons for not using FP

# of women seen at each visit (N)	Follow up visit							
	1-month 360		2-months 330		3-months 316		4-months 328	
	n	%	n	%	n	%	n	%
Number of women not using FP at each visit	341	94.7	259	78.5	213	67.4	188	57.3
Reason for not using FP methods[1]								
Not yet resumed sexual intercourse after delivery	296	86.8	192	74.1	150	70.4	129	68.6
Cannot get pregnant while breastfeeding	17	5.0	28	10.8	26	12.2	28	14.9
Need to discuss with the husband	11	3.2	8	3.1	11	5.2	4	2.1
Husband do not wish their wives to use FP	5	1.5	6	2.3	5	2.3	6	3.2
Wanted more children	2	0.6	4	1.5	4	1.9	7	3.7
Believed that contraception is not safe	4	1.8	3	1.2	4	1.9	3	1.6
Other reason	14	4.1	17	6.6	13	6.1	13	6.9

[1] Women were reporting more than one reason

9.4 Effect of FP counselling on FP uptake 4-months post delivery

Three hundred and twenty-eight HIV-positive women who were recruited in the cohort study were seen during the follow-up visit four months post-delivery. Of these 259 (79.0%) reported receiving counselling on FP use post-delivery.

9.4.1 Association between FP counselling and FP uptake after delivery

Table 9-6 shows the association between failure to use FP in 328 women four months post delivery and FP counselling adjusting for other socio-demographic factors. The variables that were tested for association with FP uptake on a univariable analysis included timing of the HIV test, number of pregnancies, education level, age, marital status and disclosure of the HIV status to the husband/partner.

Table 9-6 Association of failure to use FP with counselling provision and selected socio-demographic factors

	Total N=328	Not using FP (n=188) n	%	Univariate analysis OR	95% CI	P	Adjusted analysis OR[1]	95% CI	p
Received FP									<0.001
Yes	259	129	49.8	1		<0.001	1		
No	69	59	85.5	5.9	2.9-12.1		6.0	2.8-12.9	
Timing of the HIV test									0.04
Prior this pregnancy	84	41	48.8	1		0.067	1		
During this pregnancy	244	147	60.3	1.6	1.0-2.6		1.9	1.0-3.4	
Parity									0.02
Primigravidae	57	18	31.6	1		0.059	1		
Multigravidae	217	122	45.0	1.7	1.0-3.3		2.7	1.2-6.3	
Education level									0.27
Primary/No education	276	157	56.9	1		0.714	1		
Secondary	52	31	59.6	0.9	0.5-1.6		1.5	0.7-3.0	
Age groups									0.02
< 20 years	18	8	44.4	1			1		
20-24 years	70	31	44.3	1.0	0.3-2.8		0.6	0.2-1.9	
25-29 years	100	50	50.0	1.3	0.5-3.4		0.3	0.1-1.2	
30-34 years	71	29	40.9	0.9	0.3-2.4	0.315	0.2	0.1-0.9	
≥ 35 years	64	20	31.5	0.5	0.2-1.7		0.1	0.0-0.6	
Age not known	6	2	40.0	0.8	0.1-6.3		0.3	0.0-3.3	
HIV status disclosed to husband									0.45
Yes	198	103	52.0	1		0.017	1		
No	130	85	63.4	1.7	1.1-2.7		1.2	0.7-2.1	
Marital status									0.008
Married	234	121	51.7	1		0.001	1		
Other[2]	94	67	71.3	2.3	1.4-3.9		2.2	1.2-3.9	

[1] Adjusted for age, timing of the HIV test, parity, education level, marital status and whether the women disclosed her HIV status to the husband/partner

[2] These included women who were single (n=40), divorce (n=38) and widowed (n=16)

On a univariate analysis it was found that failure to use FP 4 months after delivery was associated with not receiving FP counselling after delivery, (OR 5.9; 95%CI 2.9-12.1), a woman not disclosing her HIV status to the husband/partner (OR 1.7; 95% CI 1.1-2.7) and being unmarried (OR2.3; 95%

CI 1.4-3.9). Other variables that showed a significant difference at p<0.1 that were retained for the multivariable analysis included timing of the HIV test, number of pregnancies and woman's age.

After adjusting for all variable included in the multivariate model HIV-positive women who did not receive any counselling on FP use 4 months after delivery had six fold higher odds of not using FP after delivery compared to those who received counselling on FP use within 4 months after delivery.

Furthermore, failure to use FP 4-months post-delivery among HIV-positive women was significantly associated with testing HIV-positive for the first time during that pregnancy and having more than one pregnancy.

Although age was not significantly associated with failure to use FP 4 months after delivery on a univariate analysis, when adjusted for other variables it was found that younger women (aged<20 years) were more likely to use FP compared to older women. Unmarried women were at a 2.3 times odds of failure to use FP when compared with married women.

9.5 Discussion

The findings that HIV-positive women who were tested for HIV before the current pregnancy were more likely to have ever used FP compared to women who were tested for HIV during the current pregnancy may be because women may prefer to delay or stop childbearing if they know they are HIV-positive.

We found that hormonal FP methods were used more commonly than barrier methods in the cohort. Injectables contraceptive methods allow women the opportunity to receive contraception without telling their partners. Injectable contraceptives are therefore useful and give an opportunity to women who do not want more children while their husbands think contrary. In the era of HIV, it is recommended that HIV-positive women should be counselled and encouraged to use dual protection. Although there was an increase in condom use among HIV-positive women 4 months after delivery (26.8%) when compared with condom use prior to the current pregnancy (8.5%), overall condom use was relatively low. This prompts an urgent need to address

the reluctance of condom use among HIV-positive women and their partners. FP counselling among HIV-positive women should work towards increasing condom acceptability and encourage women to see condoms as a means of preventing pregnancy while protecting re-infection with different strains or different types of HIV and/or provide protection to HIV-negative partners.

A high proportion (49.9%) of HIV-positive women in this study reported an unintended pregnancy, and therefore there was a high rate of unmet need for family planning and/or a high rate of family planning method failure. The findings that a higher proportion of HIV-positive women who were tested for HIV before delivery reported unwanted pregnancies compared to HIV-positive women who were tested during the current pregnancy (81.7% vs. 40.3%) was expected due to the reality explained above that women who knew that they were HIV-positive may prefer to delay or stop childbearing.

Unmet need for family planning use and FP method failure in HIV-positive women who were tested before the current pregnancy was as high as in HIV-positive women who were tested during the current pregnancy (that is, there was no difference between women who knew that they were HIV-positive before becoming pregnant with those who did not know their HIV status before pregnancy). This indicates an urgent need of counselling on FP use to both HIV-negative and HIV-positive women by providing tailored information to every woman, so that the woman can make an informed choice about her future reproductive needs.

A high proportion of women reported an intention to use FP after delivery, however, the large gap between intentions to use FP (84.9%) at cohort recruitment and to FP use four months post-delivery (42.7%) suggests that the reported willingness to use FP may not always be explained in action. This might possibly be due to courtesy bias from respondents at cohort recruitment (i.e. women telling the interviewer something she knows that he/she would like to hear). However, the fact that only 81% of our cohort members attended the 4 months follow up visit should not be ignored, since women who were seen may not be representative of the whole cohort and therefore some biases in these findings.

HIV-positive women who did not receive counseling in FP use after delivery were more likely to fail to use FP 4 months after delivery compared to HIV-positive women who received counseling

on FP use. This finding indicates the importance of strengthening FP counseling among HIV-positive women in order to remove barriers to FP use among women who have ever used family planning. Similarly, it is important to discuss reasons for not using FP among women who have never used FP, identify barriers to FP use and highlight the importance of FP utilization especial among HIV-positive women.

CHAPTER 10: INTEGRATION OF PMTCT SERVICES AND MATERNAL SYPHILIS SCREENING AND TREATMENT

10.1 Introduction

The introduction of prevention of mother-to-child transmission (PMTCT) of HIV in the antenatal care (ANC) was considered an excellent opportunity to strengthen other maternal health related interventions that are implemented in ANC such as maternal syphilis screening and treatment, family planning and malaria preventions. Furthermore, the epidemiology and transmission of HIV and syphilis are closely correlated and therefore integration of services to prevent HIV during pregnancy with maternal syphilis and screening services would be cost-efficient by saving providers' and clients' time and thus providing the potential to increase uptake of the interventions and therefore leading to improved maternal and reproductive health.

Ideally, integration results in a service that is more efficient and user-friendly through, the provision of an integrated package of services provided by one provider, at one point of delivery. According to Hardee [114], Integration can occur at several levels. At the policy level, integration could be in the form of policies that are formulated to guide the delivery of services for example in this case, guideline on how to include maternal syphilis screening and treatment in PMTCT services and vice verse. At the health facility level, integration may also take various forms and it may require training of health workers in multiple skills to enable them to deliver all the services within the same facility using a "supermarket approach" whereby services are offered by the same provider in the same unit or in different units but within the same building [114].

This chapter documents the extent of integration of PMTCT and maternal syphilis screening programmes at the facility level in three reproductive and child health (RCH) clinics and two maternity wards in Mwanza city. Data presented in this chapter were obtained from the health worker interviews, from the observation of the activities and client flow at the ANC clinics and from the observation of the ANC HIV health education sessions. Furthermore, the field notes taken by researchers on their experience in the maternity ward regarding the care of women admitted for delivery and who were not screened for syphilis during pregnancy were presented in this chapter.

10.2 Overview of the health worker interviews

Methodology for the health worker interviews was described in Chapter 4, section 5. As part of the interviews, we collected information on formal and informal training received by the health workers as well as departments or section within the facilities where the health workers were working.

As mentioned above, in order to effectively integrate PMTCT and maternal syphilis screening and treatment services, there is a need for health workers, in the ANC and in the maternity wards who are trained in skills required to implement the key components of the two programs (i.e. health workers trained in PMTCT implementation, syndromic management of STD, syphilis diagnosis and management of a positive syphilis blood test). Therefore, for the purpose of this chapter, the proportions of health workers who reported receiving training in different key PMTCT components, syndromic management of STIs and syphilis testing and who were working in the ANC and in the maternity wards (labour rooms or postpartum wards) are presented. At Nyamagana district hospital (NDH) interviews were conducted with staff who reported working in the ANC clinic as well as staff who reported working in the maternity ward.

10.2.1 Findings from the health worker interviews

In total, 89 health workers were interviewed at Bugando Medical Centre (BMC), Sekou-Toure Regional Hospital (STRH), Nyamagana District Hospital (NDH), Makongoro Regional RCH clinic and Igoma Health Centre. Overall, 76 (85.4%) reported that they were working in the ANC or in the maternity wards (labour rooms or postpartum wards), 61 (80.3%) in the maternity wards (23 at BMC, 33 at STRH and 5 at NDH) and 15 (19.7%) in the ANC clinics (six at Makongoro, three at NDH and six at Igoma health Centre) (Table 10-1).

In total, 59 (77.6%) of 61 health workers at the maternity ward and ANC reported receiving some training in PMTCT. Forty-three (56.6%) health workers at the maternity ward and ANC reported receiving training in HIV testing, 40 (52.6%) reported receiving training in voluntary counselling and testing (VCT) for PMTCT and 29 (38.2%) reported receiving training in the provision of ARV prophylaxis for PMTCT.

Table 10-1 shows the number and proportion of health workers in the maternity ward or in the ANC who reported various training in PMTCT of HIV and/or who received training in syphilis testing.

Table 10-1 Training in PMTCT subjects and syphilis testing among maternity ward and ANC health workers

	Maternity				ANC				Overall Total
Facility name	BMC	STRH	NDH	Total	Makongoro	NDH	Igoma	Total	
Total number of staff interviewed	23	33	5	61	6	3	6	15	76
Training received	Number trained								
HIV testing	17 (73.9)	15 (45.5)	3 (60.0)	35 (57.4)	4 (66.7)	1 (33.3)	3 (50.0)	8 (53.3)	43 (56.6)
VCT for PMTCT	17 (73.9)	17 (51.5)	1 (20.0)	35 (57.4)	3 (50.0)	1 (33.3)	1 (16.7)	5 (33.3)	40 (52.6)
Provision of ARV for PMTCT	13 (56.5)	11 (33.3)	0 (00.0)	24 (39.3)	3 (50.0)	1 (33.3)	1 (16.7)	5 (33.3)	29 (38.2)
Infant feeding counseling	13 (56.5)	13 (39.4)	1 (20.0)	27 (44.3)	2 (33.3)	1 (33.3)	2 (33.3)	5 (33.3)	32 (42.1)
Optimal obstetric care	12 (52.2)	9 (27.3)	1 (20.0)	22 (36.1)	2 (33.3)	1 (33.3)	0 (00.0)	3 (20.0)	25 (32.9)
PMTCT record keeping	9 (39.1)	10 (30.3)	0 (00.0)	19 (31.1)	3 (50.0)	1 (33.3)	1 (16.7)	5 (33.3)	24 (31.6)
New PMTCT guidelines 2007)	15 (65.2)	12 (36.4)	1 (20.0)	28 (45.9)	3 (50.0)	0 (00.0)	4 (66.7)	7 (46.7)	35 (46.1)
Any of the PMTCT subjects above	19 (82.6)	23 (69.7)	4 (80.0)	46 (75.4)	6 (100.0)	2 (66.7)	5 (83.3)	13 (86.7)	59 (77.6)
Syphilis testing	10 (43.5)	4 (12.1)	1 (20.0)	15 (24.6)	2 (33.3)	1 (33.3)	4 (66.7)	7 (46.7)	22 (28.9)
Both syphilis testing and any of the PMTCT subject above	9 (39.1)	3 (9.1)	0 (00.0)	12 (19.7)	2 (33.3)	1 (33.3)	4 (66.7)	7 (46.7)	19 (25.0)

Also, 32 (42.1%) reported receiving training in infant feeding counselling for HIV-positive women, 25 (32.9%) reported receiving training in optimal obstetric care, 24 (31.6%) reported receiving training in PMTCT record keeping and 35 (46.1%) reported to have received training in the national PMTCT guidelines of 2007 (Table 10-1).

Training in syphilis testing was reported by 22 (28.9%) of the 76 health workers who were working in the ANC and in the maternity ward (Table 10-1). Of these, 15 (24.6%) were health workers who reported working in the maternity ward and seven (46.7%) were health workers who reported working in the ANC clinics (Table 10-1).

Only one quarter (25.0%) of health workers in the maternity ward and in the ANC reported receiving training in both PMTCT and syphilis testing. Nine (39.1%) and three (9.1%) health workers in the maternity wards at BMC and STRH respectively reported receiving some training in PMTCT and syphilis testing. There was no health worker who was trained in both PMTCT and syphilis testing in the maternity ward at NDH. In the ANC, two (33.3%), one (33.3%) and four (66.7%) of health workers reported receiving training in PMTCT and syphilis testing at Makongoro, NDH and Igoma health centre respectively. Health workers in the ANC were more likely to report receiving training in both PMTCT and syphilis testing compared to health workers in the maternity ward, though the total number interviewed were relatively small and this difference was not statistically significant.

10.3 Overview of the observation of the flow of activities within ANC clinics

Observation of the flow of activities within the ANC was described in chapter 4, section 3.2.1. Data collected provided information on different stations in the ANC where pregnant women attending ANC for first time during the current pregnancy receive different services regarding their pregnancy, the average time (in min) the woman had to wait before receiving different services, the average time (in minutes) the woman spent receiving different services at each station and the distance covered (in metres) from one station to another within the clinic while accessing different services.

10.3.1 Findings from the observation of the clinic flow

At each of the ANC clinics two observations were conducted one on a Monday when the ANC clinics are very busy and one on a Thursday when the clinics are less busy. Findings that

summarized in boxes for observation on busy days and findings that are presented in the pictorial format are for the less busy days. These findings are presented differently for each of the three ANC facilities that participated in this study.

10.3.1.1 ***Flow of ANC clinic activities at NDH***

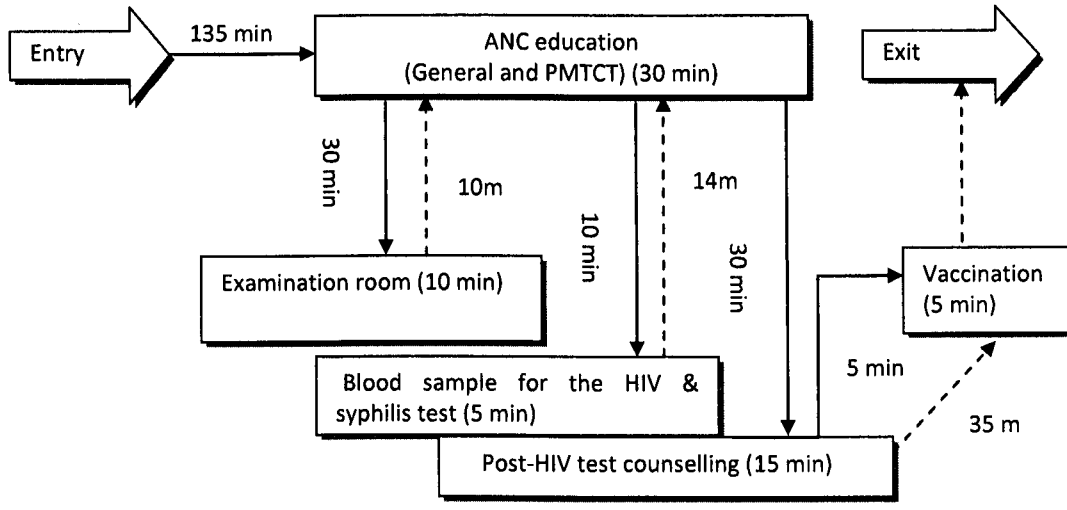
Box 10-1 Observation case study 1-First day at NDH ANC clinic

Aisha arrived at the clinic on a Monday morning at 08.15 hrs. She waited for the services in the waiting area (which is also used for the health education). The nurse arrived at this station at around 11.15 hrs. The nurse introduced herself and gave a short talk on general health including HIV and PMTCT for 15 minutes. After the talk, Aisha waited for 20 minutes and at 11.50 hrs, Aisha entered the examination room and exited the examination room at 12.00 hrs. Aisha then waited at the waiting area for 50 minutes before she was called in the second room where the blood sample for RPR and for an HIV test was taken. Aisha came out of this room at 12.55 hrs and waited on a bench at the waiting area until she was called back for her syphilis and HIV results at 13.25 hrs. She came out of the counselling room at around 13.40 hrs and she went to the waiting area for the tetanus toxoid (TT) vaccination, she waited on a bench for 5 min then she was called for the vaccination and she came out of the vaccination room at 13.50 hrs. Overall, she spent 335 minutes at the clinic, 285 minutes (85%) waiting for the services and 50 minutes (15%) having the services

In Box 10-1 which is presenting the flow of the clinic activities of day 1 (Monday) at NDH. It was found that Aisha (not real name) was in the clinic for 5 hours and 35 minutes. She waited for 180 minutes (3hours), before receiving any service. The waiting time between services ranged between 5 minutes to 50 minutes (this excludes the waiting time before the initial contact with the health worker), and the total waiting time after the first contact with the health worker was 105 minutes. Only 50 minutes was used having the health education and other clinical contact with the nurse, this ranged between 5 to 15 minutes per service contact.

Figure 10-1 shows the movement of Julia at NDH ANC on day 2 (Thursday), a less busy day. Julia was in the clinic for 4 hours and 35 minutes. She waited for 135 minutes (2 hours and 45 minutes) before receiving any service. After the first contact with the health worker, the waiting time between services ranged between 5 minutes to 30 minutes. The total time that Julia spent waiting for different services in the clinic was 75 minutes. The total time that Julia spent accessing different services was 65 minutes and this ranged between 5 to 30 minutes per service contact. During the movement from one station to another in order to access different services at the clinic, Julia covered a distance of 107 meters (0.1km).

Figure 10-1 Client movement at NDH ANC clinic – first ANC visit during the current pregnancy



Key: *For figures 10-1 to 10-3, the numbers on the solid arrows indicate the average waiting times (minutes), the number on the dashed arrows indicates the distance from one station to another in meters and the numbers in the boxes indicates the time spent at each station (minutes)*

Overall, women at both days experienced longer waiting hours before being seen by the health worker and the reasons for this phenomenon was not clear.

10.3.1.2 *Flow of ANC activities at Makongoro RCH*

Box 10-2 presents the observation of the clinic flow at Makongoro on day 1 (Monday). Mwasi was in the clinic for 4 hours and 10 minutes. She waited for 20 minutes before the start of the clinic activities. However, between the services she had long waiting times that ranged between 7 minutes to 60 minutes. The total waiting time after the first contact with the health worker was 187 minutes. The total time that the woman spent accessing different services was 73 minutes and this ranged between 3 to 25 minutes per service contact.

Box 10-2 Observation case study 2-First day at Makongoro ANC clinic

Mwasi arrived at the clinic on a Monday morning at 08.10 hrs. The general health education started at 08.30hrs and lasted for 23 minutes. After the health education talk Mwasi waited for 30 minutes before she was called to the registration table where she was given the ANC card and her details were documented. After the registration, Mwasi was sent to the examination room. Both registration and examination lasted for 7 minutes. Mwasi was then sent to the laboratory. She waited at the laboratory waiting area for 40 minutes before she was called into the room where a blood sample was taken. She was in the laboratory for 5 minutes. From the laboratory she went straight to the PMTCT room 1 for the ANC HIV education (group counselling), Mwasi sat in the room for 1 hour waiting for the session to start. The session started at 11.15 hrs. The ANC HIV education lasted for 25 minutes. Mwasi sat in the PMCTC waiting area for 50 minutes. Then she was called into PMTCT room 2 for individual HIV post-test counselling. She spent 10 minutes in the PMTCT room 2. After the HIV post-test counselling Mwasi went to the vaccination room, located outside the main building. She waited for the service there for 7 minutes, when she entered a room she spent 3 minutes and she left the ANC facility at 12.50. In total, she spent 280 minutes at the clinic, 207 minutes (74%) waiting for the services and 73 minute (26%) receiving various services

Figure 10-2 Client movement at Makongoro ANC clinic – first ANC visit during the current pregnancy

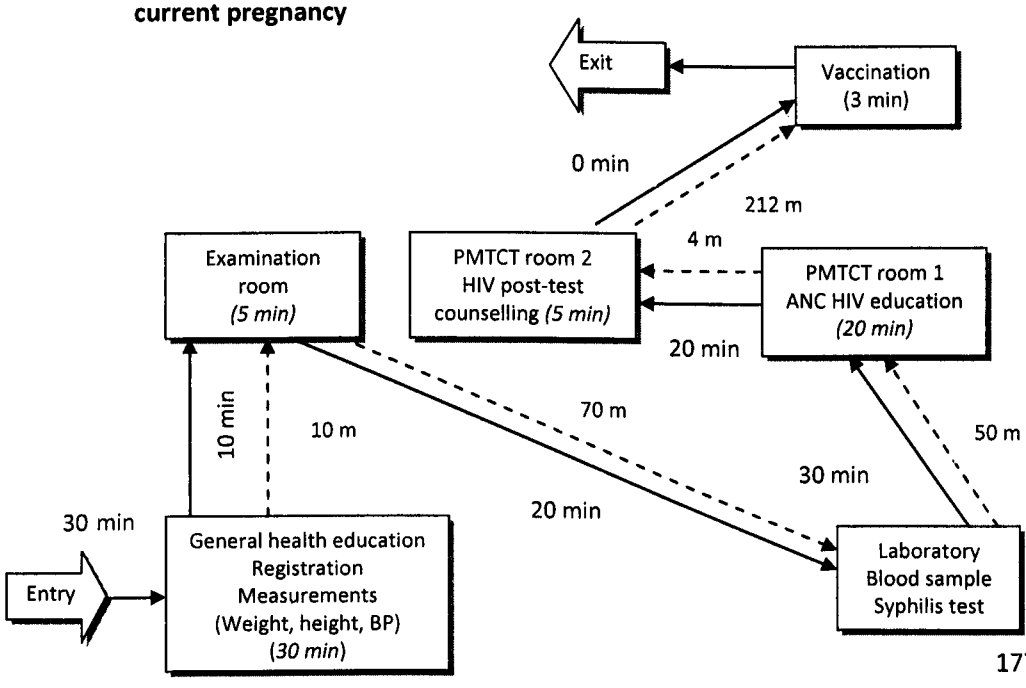


Figure 10-2 shows the movement of Maria at Makongoro ANC on day 2 (Thursday). Maria was in the clinic for about 3 hours. She waited for 30 minutes before receiving any service. The waiting time between services ranged between 0 minutes to 30 minutes. The total time that Maria spent waiting for different services in the clinic was 80 minutes. The total time that Maria spent accessing different services was 68 minutes and this ranged between 5 to 30 minutes. Moving from one station to another in the clinic while accessing different services Maria covered a distance of 354 meters (0.35km).

Women attending at Makongoro had longer waiting times between the laboratory services and the PMTCT group counselling session and this is because all women were supposed to have their blood sample taken before the PMTCT group counselling session could start.

10.3.1.3 *Flow of ANC activities at Igoma RCH clinic*

Box 10-3 presents the flow of the clinic activities of day 1 at Igoma RCH clinic. The woman was in the clinic for 4 hours and 15 minutes. She waited for 45 minutes before receiving any service. The waiting time between services ranged between 5 minutes to 60 minutes and the total waiting time was 140 minutes. The total time that the woman spent accessing different services was 65 minutes and this ranged between 3 to 20 minutes.

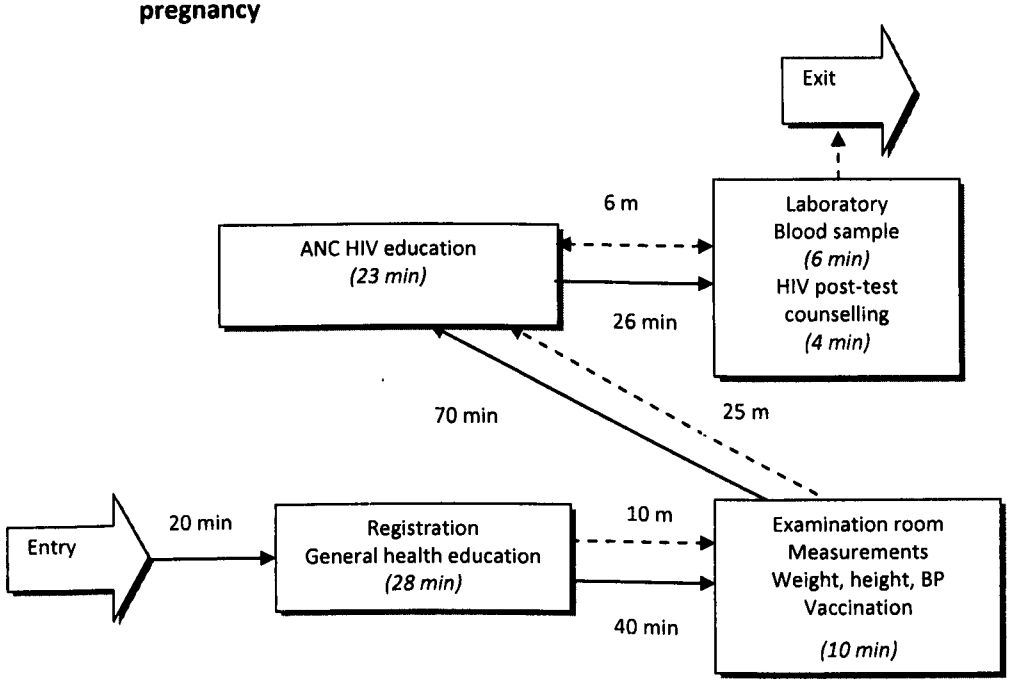
Box 10-3 Observation case study 3-First day at Igoma ANC clinic

Nyanjige arrived at the clinic 09.30hrs. The general health education started at 10.15hrs, and it lasted for 15 min. After the health education, she waited for 60 minutes before she was called at the registration table where she was given the ANC card and her details were documented. Immediately after the registration, Nyanjige entered the examination room at 11.35hrs where palpation and head-to-toe examination were done. This examination room was also use for the TT vaccination; therefore, Nyanjige was vaccinated before leaving this room. Examination and vaccination took 15 minutes. Nyanjige came out of the examination room at 11.50hrs and she was asked to go to the back of the building to gather with other women who were waiting for the ANC HIV education session. Her ANC card was taken to the laboratory. The ANC HIV education session started at 11.55hrs and it lasted for 20min. At 13.00hrs, Nyanjige entered the laboratory and a blood sample for HIV test and syphilis testing was taken, Nyanjige came out the laboratory at 13.03hrs. Nyanjige was called back to the laboratory after 30min for the HIV post-test counselling and syphilis results. Nyanjige came out of the laboratory at 13.40hrs. Overall, Nyanjige was at the clinic for 255 minutes, 190 minutes (75%) was spent waiting for the services and 65 minutes (25%) accessing various services

Note: At Igoma the laboratory is used as a HIV post-test counselling room

Figure 10-3 shows the movement of Rhoda at Igoma ANC on day 2 (Thursday). Rhoda was in the clinic for 3 hours and 37 minutes. She waited for 20 minutes before receiving any service. The waiting time between services ranged between 26 minutes to 70 minutes. The total time that Rhoda spent waiting for different services in the clinic was 136 minutes. The total time that Rhoda spent accessing different services was 71 minutes and this ranged between 4 – 28 minutes. During the movement from one station to another in order to access different services at the clinic, Rhoda covered a distance of 53 meters (0.05km).

Figure 10-3 Client movement at Igoma ANC clinic – first ANC visit during the current pregnancy



10.3.1.4 *Summary finding of the observation of the clinic activity flow*

Table 10-2 summarises the time spend and the distance covered in the ANC facilities during the two days of observation of the clinic activity flow. In general, women attending ANC for the first time during the current pregnancy spent approximately 3hours to 5hours and 30 minute at the clinic. Women at NDH waited for 2 to 3 hrs before they could get any service whereas at Makongoro and Igoma the waiting time before receiving any service was between 20 minutes to 45 minutes. After the initial contact with the health worker (when they start receiving the services), the total waiting time from one station to another was longer for the

busy days compared to the less busy days at NDH and Makongoro RCH clinic. At Igoma, the difference between the busy day and the less busy day was 9 minutes only (Table 10-2).

It was found that in all clinics, the total time a client waits is 42 minutes up to 235 minutes longer than the time she spends receiving services. At NDH clinic, much of the waiting time is explained by a long delay before starting to receive any service, but even when that waiting time (before starting to receive any service) is excluded, the woman spend on average 10 minutes to 114 minutes more time waiting between stations than receiving services. There was no difference between the time the woman spend while accessing the services when compared the busy and less busy days.

Table 10-2 Time spend and distance covered in the ANC by first ANC attendees in Mwanza

	NDH		Makongoro		Igoma	
	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2
Total time the woman spent at the facility (min)	335	275	280	178	255	217
Waiting time before receiving any service (min)	180	135	20	30	45	20
Total waiting time from one station to another (min)	105	75	187	80	145	136
Range of the waiting time between station (min)	5-50	5-30	7-60	0-30	5-60	26-70
Total time spend accessing services at different stations (min)	50	65	73	68	65	71
Range of time spending accessing services (min)	5-15	5-30	3-25	3-30	3-20	4-28
Difference between time spent waiting for the services and time used to access services	235	145	134	42	125	85
Difference between time spent waiting for the services and time used to access services excluding the waiting time before starting to receive services	55	10	114	12	80	65
Total distance covered within the clinic (km)	0.10		0.35		0.05	

With the exception of women attending at Makongoro clinic, the distance covered while accessing the services was short and this is because these two health facilities are small and all the services were offered within the premises and with few movements. Generally, the

total distance covered while accessing various services at all the clinics was shorter. However, at Makongoro, the distances the women had to walk was relatively longer than at the other facilities because vaccination services were offered outside the main ANC premises.

10.3.2 PMTCT and syphilis screening and treatment activities that are integrated in ANC

Table 10-3 shows the activities that are integrated in the ANC clinics that participated in this study. The information presented below was based on the principal investigator's observations at these facilities during the seven months period of the study and not only what was observed during the two days of the observation of the activity flow in the ANC.

Activities were done slightly different at each ANC facility except for the record keeping whereby at all ANC facilities, information on access to PMTCT services were documented in designated register books for PMTCT. These a special registers with pre-written columns indicating the information that should be documented for all women who are tested for HIV at that particular facility. Information on syphilis screening and treatment services were recorded in ordinary handwritten register books, some were of low quality and sometimes torn. Information recorded in these syphilis screening and treatment register books were different at each facility,

Linking PMTCT and syphilis screening and treatment services was not possible when looking at the register books only. This was because the numbering system for the PMTCT register was different to that used in the other ANC records and therefore the woman in the PMTCT book was given a different identification number.

Table 10-3 Integrated PMTCT and maternal syphilis screening and treatment activities

Activity	Facility name		
	NDH	Makongoro	Igoma
Health education	Health education is always given once but did not cover both syphilis and HIV instead the two topics and other major topics in ANC (e.g. Malaria prevention, FP) are being alternated on a daily bases.	Syphilis education is part of the general health education and it was not mentioned at all in ANC HIV-education talk. However, although not often HIV general education was also touched on during the general ANC health education during the observed sessions	Syphilis education is part of the general education, but for the ANC HIV education sessions that were observed the counselor while explaining the "opt-out" concept she touched on issues around syphilis screening and treatment during pregnancy.
Blood sample collection	One blood sample collected by the counselor	For women who attend ANC for the 1st time at Makongoro the one blood sample is taken in the lab by the lab technician. After doing the RPR test the lab technician takes the tube containing the remaining blood to the counselor in the PMTCT room for HIV testing. However, the counselor has to do a finger prick for women referred to Makongoro from other ANC facilities that do not offer PMTCT	At Igoma ANC clinic one blood sample was taken by the lab assistant (if she was available) or by the PMTCT counselor. (The lab assistant was working part time)
Testing	Both syphilis test and HIV test were done by the same person.	RPR test was done in lab and HIV test was done by the counselor in the PMTCT room 2	RPR test done by the lab assistant (when present) otherwise both test (HIV & RPR) done by a counselor
Giving results	Both syphilis and HIV results are given by the same health worker, in case of RPR positive and if the medicine is available at the clinic, this health worker is the one who give the treatment also the woman contact(s) who came for syphilis treatment are being attended at the same station.	PMTCT counselor does the post-test counseling and gives HIV results while RPR-positive women are sent back to see the nurse in the examination room who gives the RPR results and treat both woman and her contact(s)	Both RPR and HIV results are communicated back to the pregnant woman by the PMTCT counselor. RPR positive women are sent to the STD clinic based within the health centre for treatment.

10.3.3 PMTCT and syphilis screening and treatment at the maternity ward

According to the Tanzanian PMTCT guidelines [37], all pregnant women admitted for delivery with unknown HIV status should receive "opt-out" HIV testing. After routine pre-test education if the woman consents, a rapid HIV test is performed so that ARV prophylaxis for PMTCT can be administered before delivery in case the woman found to be HIV-positive. During this study, we observed that this was often happening at both BMC and STRH maternity wards and as a result, 70 (17.4%) of HIV-positive women who were recruited in the cohort were tested for HIV at the maternity ward.

Similarly, maternal syphilis screening is a national policy in Tanzania [106] and it is recommended that at the time of delivery, syphilis test results should be reviewed, and the infant evaluated for signs of CS. Furthermore, the guidelines recommend that women who missed a RPR test during antenatal care should be tested during delivery and the test results should be obtained as soon as possible so that early treatment can be given to the infant of women who test RPR positive and to the mothers. However, neither recommendation was being implemented at the two maternity wards in this study; therefore this demonstrated a total failure in the integration of PMTCT for HIV and syphilis at delivery.

10.4 Discussion

Adapting the definition that was given by Hardee[114] to this study, facility integration refer to facilities or sites at which both syphilis screening and PMTCT services are available and offered at the same time by the same provider or referred to another provider within the same premises. From this modified definition, we can conclude that at the ANC facilities that participated in this study syphilis screening and PMTCT services were integrated. However, from the observation of the activities that were conducted in the ANC facilities, there is still a room for improvement. For example, this study found that women were spending longer waiting hours in the ANC facilities. Ideally integration should aim at reducing the time spent while accessing the services and for the case of this study, strategies such as combining the health education (general and PMTCT) so that these could be given once by the same health worker, will lead in reduced waiting times and human resource needed for these services compared to when they are offered differently as it is now. This also applies for other services

such as testing for HIV and syphilis as well as giving results and treatment when applicable. Other strategies that could be considered include encouraging women to attend at ANC on less busy days when the waiting times are shorter. There is also a need to start offering the services promptly at the official clinic opening hours.

In Tanzania, both PMTCT and maternal syphilis screening and treatment services are documented policies. However, the absence of integrated guidelines and protocols regarding syphilis screening within PMTCT services and vice versa it might be a challenging for direct service providers. This study found that attending a private ANC facility was associated with failure to test for HIV during pregnancy, though this was not the case for syphilis screening during pregnancy (Result presented in Chapter 6). This implies that syphilis was prioritised equally in both private and public facilities whereas PMTCT was "ignored" in some of the private ANC facilities. The absence of integrated policy regarding these two important maternal services hinder the successful implementation of the programmes and give a loop hole for other providers not to consider offering some of these important services to pregnant women.

At the service delivery level (i.e. ANC and the maternity wards) integration of PMTCT and maternal syphilis screening is very important, from the client's point of view; it may be difficult to separate PMTCT and syphilis screening during pregnancy. The client is disadvantaged if offered PMTCT without being screened for syphilis and vice versa. However, this is also the level whereby for the integration to be successful, availability of trained and motivated health workers remains crucial. This study found that a very small proportion (12.5% and 47%) of health workers in maternity ward and in the ANC facilities respectively reported receiving some training in syphilis screening and PMTCT. This finding is an indicator of a challenge in the implementation of integrated services. As Hardee and Yount [114] indicated, adequacy of trained staff has been documented as an obstacle for integrated services. For a successful integration of these two important reproductive and maternal health programs, there is an urgent need of a phased onsite training where health workers at all levels should be taught on new skills apart from their formal training without interrupting the services by sending health workers away from their workstations for retraining.

CHAPTER 11: DISCUSSION

This chapter discusses the key findings of this research and compares our findings with the findings from other studies conducted elsewhere. Strength and limitations of the study, and key recommendations are also presented in this chapter.

11.1 Research key findings

11.1.1 Completion of PMTCT steps

Drop out from PMTCT interventions occurs at every step after testing. Results revealed that by the end of four months post-delivery, only 41% of HIV-positive women had successfully completed all PMTCT steps. Other studies that were conducted in sub-Saharan Africa also reported a cumulative drop out of up to 70% over four months after delivery and about 81% over a period of six months after delivery [79, 115-116].

Ideally, PMTCT facilities in ANC or in the maternity wards would offer HIV testing to all pregnant women. However, we found that more than 20% of pregnant women who attended ANC during pregnancy and who delivered in hospitals that offered PMTCT services in Mwanza city left the maternity ward with unknown HIV status. In addition, we found that 13%, 26% and 48% of HIV-positive women participating in the cohort study who were tested before pregnancy, at ANC during the current pregnancy and at the maternity ward before delivery respectively, did not receive any ARV prophylaxis for PMTCT. These findings indicate a failure in the implementation of PMTCT since such women had an opportunity to delivery in hospitals that provide PMTCT services. A qualitative study conducted in South Africa found that a high proportion of pregnant women accessing maternal services at facilities that offer PMTCT are not offered the services due to reasons such as shortage of counsellors or unavailability of test kits or PMTCT forms[117]. In our study sites, test kits stock-outs, unavailability of counsellors, especially in the maternity wards, and lack of ART drugs at ANC and in the maternity wards were often reported.

Review of records at the ANC found that a high proportion (97.5%) of pregnant women who received PMTCT HIV pre-test counselling accepted an HIV test, tested at ANC and 8.3% were HIV-positive. However, about half of these HIV-positive women were not given any ARV for PMTCT. This finding is consistent with the results from other operational studies conducted in

Sub-Saharan Africa that found that only about 50% or less of HIV-positive pregnant women received ARV to prevent HIV transmission to their infants [118-119].

Overall, 83% of HIV-exposed infants in this study received ARV prophylaxis for PMTCT. In Tanzania, it is recommended that infants born at facilities that have the capacity to initiate ARV treatment should receive sdNVP supplemented with the more efficacious, longer term AZT prophylaxis regimen [37]. Both Bugando Medical Centre (BMC) and Sekou-Toure Regional Hospital (STRH) have delivery suites that include ARV initiating facilities in Mwanza city. However, 28% of the infants who received ARV for PMTCT were only given sdNVP. Presumably, this was due to unavailability of AZT syrup for the infants in the maternity ward or lack of knowledge on the new recommended infant regimen among health workers dispensing ARV in the maternity ward.

Counselling women to make an informed choice on infant feeding is of crucial importance and various studies have documented the importance of infant feeding counselling on improved adherence to infant feeding recommendations [120-122]. According to the Tanzanian guidelines in PMTCT, counsellors who are health workers need to assess each individual woman's situation in order to establish what is most feasible and safe for her infant before discharge from the hospital [37]. In this study, we found that about 27% of women who delivered in hospital were not counselled on infant feeding methods and 40% of women who had not been counselled on infant feeding options at delivery were unsure about the feeding method to use for their infants.

During infant feeding counselling time is required to explain the factors that increase postpartum HIV transmission through breast milk and the risk of morbidity from replacement feeding and how to reduce such risks. This requires a counsellor who is knowledgeable and who can translate complex scientific concepts of such risks into a simple message that is understood by women. Often these requirements are rarely fulfilled in many African countries and as a result counselling on infant feeding in many African countries, including Botswana, Kenya, Malawi and Uganda, has been reported to be suboptimal [123]. Among 73% of HIV-positive women in our cohort study who reported receiving counselling on infant feeding choices, 28% of them were practising mixed feeding for their infants four months after delivery. We found that one of the most important reasons for this common practice of mixed

feeding among HIV-positive women is lack of knowledge about the risks involved by practising mixed feeding to their HEI. Other reasons included lack of disclosure of the HIV status and insufficient breast milk.

11.1.2 Factors associated with failure to complete different PMTCT interventions

There was no association between failure to test for HIV during pregnancy and most of the women's socio-demographic characteristics in this study. In this regard, our findings differ from several studies that reported the association between HIV testing during pregnancy and marital status, education level and age [84, 124-127]. However, these studies were conducted when HIV testing was offered as opt-in and when women were supposed to come back for their HIV test results after one month. Our study indicates that HIV testing offered as a routine service (opt-out) with the same day results is acceptable and in Mwanza city it reaches women of different socio-demographic characteristics equally as it has been also documented in other studies [79, 125, 128].

Currently in Tanzania, the PMTCT programme is still at a scaling-up stage, with higher coverage in health facilities located in urban areas compared to health facilities in rural areas. This fact explains the association we observed between attending an ANC facility located outside Mwanza city and failure to have an HIV test during pregnancy. Similar findings were reported by a study conducted in Uganda [76].

Less than three ANC visits during pregnancy was found to be a strong determinant of failure to test for HIV during pregnancy as well as failure to use ARV for PMTCT. Such a patterns was also reported in studies that were conducted in Burkina-Faso and Western Kenya [129-130]. In Tanzania, it is recommended that pregnant women should be offered an HIV test during the first ANC visit [37]. However, obstacles to this include attending an ANC facility that does not offer PMTCT services, arriving at the ANC facility for the first visit late in the day or not being offered the services when attending for the first visit.

Association between attending a private ANC facility and failure to have an HIV test during pregnancy reveals the fact that HIV testing for PMTCT may not be offered consistently in private facilities in Mwanza city and such findings need to be investigated more.

High knowledge of the health services users may possibly increase communication between the health services users and providers. Also it improves retention of provided information and thus better adherence to recommended interventions. This study, found out that failure to use ARV for PMTCT was associated with educational level, similar to studies in Zambia and Kenya. Both studies reported that non-adherence to sdNVP was associated with no high school education or with a low educational level [130-131].

In this study, it was found that failure to use ARV for PMTCT was associated with failure to attend a CTC before delivery. Such findings are not widely reported by other studies. However, in Tanzania, HIV-positive women attending a CTC before delivery have a high chance of being assessed for eligibility for HAART initiation. Those found to be eligible should be started on HAART and those who are not eligible should be given ARV prophylaxis from a CTC[37]. These women also had the opportunity to receive more counselling compared to those who did not attend a CTC.

From the cohort study, we found that failure to attend a CTC before delivery was strongly associated with failure to complete the four key PMTCT interventions. HIV-positive women who attend a CTC may have more opportunities to understand their HIV illness better and to learn more about the interventions available to them and are better motivated to take up the interventions. Furthermore, for women who attend a CTC they are more advantaged because interventions such as ARV are available for them.

Unlike a number of other studies [132-133], this study found that lack of a woman's HIV status disclosure to the partner was not associated with failure to use ARV for PMTCT. This might be due to the fact that this study report on findings from women who delivered in hospital and who, in most case, were given sdNVP for PMTCT. A study in Zambia reported that use of ARV for PMTCT was associated with disclosure of HIV status among pregnant women who had home deliveries [131].This is because in most cases of home deliveries husbands are often present and the women might not want to use the medication in their husbands' presence if they have not disclosed their HIV status.

11.1.3 ANC HIV education and women's knowledge about HIV, MTCT and PMTCT

In Tanzania, it is recommended that group pre-test HIV education and counseling should be done in order to facilitate the integration of PMTCT services into existing sessions of ANC services, routinely performed by the current clinic staff [37]. The PMTCT guidelines in Tanzania also recommend that, during these sessions, a health care worker should share information with pregnant women, but she/he should be careful to avoid dominating the session. However, for the group counselling sessions that were observed during the observation study, we found that pregnant women's participation in the discussion was minimal. Though we did not explore what the reasons were for poor participation in these discussions, presumably factors such as lack of understanding, having no interest in discussing issues around HIV/AIDS openly, anxiety about the results, and being tired following long hours in the clinic might contribute to this finding.

From the cross-sectional study of pregnant women admitted for delivery at BMC and STRH, we found that women who received ANC HIV education during the current pregnancy had a high knowledge of HIV, MTCT and PMTCT of HIV compared to women who did not attend. Furthermore, in the same study it was revealed that women who had a high knowledge about HIV, MTCT and PMTCT were more likely to have had an HIV test compared to those whose knowledge was low. These findings indicate the importance of ANC HIV education in the effectiveness of PMTCT programmes.

11.1.4 Referral and care for HIV-positive pregnant women

From the cohort study, we found that about 50% of HIV-positive women who were tested at ANC during the current pregnancy did not get information or referral to attend a CTC before delivery. This is one of the health systems failures that were observed in the implementation of PMTCT in our study settings.

PMTCT is a comprehensive set of interventions that require capable health workers. Several studies have documented the importance of health workers training in order to optimize the effectiveness of PMTCT [117, 134-135]. We found that, due to lack of adequate training and updates on the new PMTCT guidelines in Tanzania, some of the health workers that were interviewed did not know when to refer HIV-positive women to a CTC and as a result, such

women failed to attend a CTC before delivery. A study conducted in South Africa also reported that incorrect instructions from the health workers to HIV-positive women about PMTCT interventions was one of the health systems' failure which contributed to the missed opportunities for participation in PMTCT [117]. These findings prompt an urgent need of ongoing refresher training of health workers.

According to the current national PMTCT guidelines, women who receive HIV counselling and testing during labour should receive post-test counselling during the postpartum period before discharge from the hospital. Post-test counselling also consists of giving the information on referral available to the woman, including referral to CTC services [37]. However, none of the HIV-positive women in the cohort study, who were tested at the maternity ward, received a referral to a CTC before discharge from the hospital after delivery. Although the reasons for this particular failure were not explored, presumably lack of training (e.g. health workers at the maternity ward did not know the referral system) or high workload in the maternity wards (e.g. no time to go through the paperwork for referral) might have contributed to this PMTCT implementation failure.

We found that about half of the women who received referral to attend to a CTC did not attend a CTC. This might be due to individual factors such as fear of disclosing their HIV status and also fear about using ARV. Health workers who were interviewed in this study pointed out that lack of coordination between ANC clinics and CTC was a major obstacle for women's attendance to CTC before and after delivery and they recommended the integration of care and treatment services into maternal health services. This was also recommended in a review of multi country PMTCT programs [135].

Only 20% of HIV-positive women who were identified through PMTCT service were successfully taken through the referral system to attend an adult HIV care and treatment centre. This finding prompts an urgent need of a coordinated integration of maternal and HIV care and treatment services offered to pregnant women.

11.1.5 Family planning uptake among HIV-positive women

Preventing unintended pregnancies among HIV-positive women is important in order to achieve PMTCT goals and is the second component among four WHO strategies to prevent

mother-to-child transmission of HIV [14]. In our cohort study about 50% of HIV-positive women reported unintended pregnancies, and therefore, a high rate of unmet need for family planning. This was twice as much as that reported in the general population in Tanzania[136]. It indicates a need for integrating family planning use in HIV prevention services in our community.

The findings that HIV-positive women who were tested for HIV before the current pregnancy were more likely to have ever used FP compared to women who were tested for HIV during the current pregnancy may be because women may prefer to delay or stop childbearing if they know they are HIV-positive. This is similar to the results of the of the analysis of the Demographic and Health surveys (DHS) data of four African countries that was conducted by Johnson *et al* [137], who documented that knowledge of one's own HIV-positive status was significantly associated with a desire to use contraceptive so as to limit childbearing.

It was found that hormonal FP methods were used more commonly than barrier methods in the cohort. This was probably because injectable contraceptive methods allow women the opportunity to receive contraception without telling their partners. IUCD were rarely used in our cohort as well as in a study conducted in Rwanda [138]. A study conducted in Ghana found that there was a small number of providers with practical experience of inserting the device and that the product design was perceived to be unacceptable to the users. Reasons such as fear of excessive bleeding and weight loss may also have discouraged potential users[139].

Condom use among both HIV-positive and HIV-negative women in the era of HIV is of critical importance. While condom use among HIV-positive women in our cohort study was generally very low, we found that women who knew their HIV-positive status before the current pregnancy were more likely to report using condoms as contraception before this pregnancy compared with women who did not know their HIV status before the current pregnancy. Similar results were also reported by Johnson *et al* [137]. It is also important to note that condom use during pregnancy and breastfeeding among HIV-negative women would protect them and their infants from incident HIV infection and therefore a need a strong need to continue promoting condom use for pregnant and breastfeeding women.

This study revealed that unmet need for family planning use before the current pregnancy was similar among women who knew their HIV-positive status before delivery and those who were tested HIV-positive during the current pregnancy. This was similar to the findings reported in other studies conducted in Africa [137].

A high proportion (40%) of women in our cohort study reported that they were not using FP methods four months postpartum because they had not resumed sexual activity after delivery. However, this might be under-estimated due to the fact that about 19% of the cohort participants had lost to follow up four months after delivery. Time to resumption of sexual activity after delivery was estimated to be 6–8 weeks in the general population in studies conducted in Europe [140-142]. The difference between our study and the previous documented studies might be due to reasons such as anxiety after learning the HIV-positive status, unwillingness to discuss sexual behavior and sometimes ill health following delivery that should be expected among our study participants. On the other hand, delay in resumption of sexual activity after delivery among HIV-positive women could be useful in the sense that the women have a number of MCH visits where FP counseling could be done and FP methods offered before they resumes sexual activity.

Previous studies have confirmed that fears of side effects from contraception use are often a barrier to the acceptance of contraceptive methods, and such concerns often result in a dependence on traditional forms of contraception (for example. withdrawal, calendar/safe days) [143]. Similarly, a small proportion of women in our cohort study reported not using any contraception because they believed that contraceptives were not safe.

HIV-positive women who did not receive counseling in FP use after delivery were more likely to fail to use FP methods four months after delivery compared to HIV-positive women who received counseling on FP use. This finding indicates the importance of strengthening FP counseling among HIV-positive women in order to remove barriers to FP use. It is important to identify other barriers to FP use and to highlight the importance of FP utilization particularly among HIV-positive women.

11.1.6 Maternal syphilis screening and treatment

Prevention of congenital syphilis remains an important ongoing public health challenge. In this study, it was found that the majority (88.1%) of pregnant women who were admitted to hospital for delivery and who attended ANC at least once during the current pregnancy were screened for syphilis.

Both RPR positive women who were not treated during pregnancy and infants born to RPR positive women were not treated for syphilis before discharge from the hospital after delivery/birth. This is a major concern to effectiveness of maternal syphilis screening and treatment programs in Tanzania and constitutes a missed opportunity for prevention of congenital syphilis among infants born in hospitals. Our findings also suggest a high level of provider non-compliance with the national policy that clearly recommends screening of women who missed an RPR test during antenatal care and treatment for women not treated during pregnancy and infants born to RPR positive women [106].

Failure to screen for syphilis during pregnancy in this study was found to be associated with fewer number of ANC visits during pregnancy. Theoretically, women with more ANC visits have opportunity to be screened during the subsequent visits if they missed the test at the first or second visit. Studies conducted in another place also documented that efforts to prevent congenital syphilis may be more effective among women who have more visits to prenatal care [144-145].

Attending an ANC facility located outside Mwanza city was found to be a risk factor for failure to screen for HIV during pregnancy. In reality, health facilities in many rural areas in Tanzania and other parts of Africa have many shortcomings. Programme scale-up to rural health facilities might take longer or might not be sustainable. A study in Malawi reported that, due to unsustainable programmatic requirements, and despite maternal syphilis screening and treatment being a national policy, routine antenatal syphilis screening and treatment were suspended in many rural health facilities in Malawi [146].

11.1.7 Integration of PMTCT and maternal syphilis screening and treatment

Adapting the definition by Hardee *et al* [114] to this study, integration of PMTCT and syphilis screening and treatment at a facility level could refer to facilities or sites at which both syphilis screening and PMTCT services are available and offered at the same time by the same provider or referred to another provider within the same premises.

We found that at the ANC facility level, PMTCT and maternal syphilis screening and treatment services were integrated in the sense that services were available at the same facilities although sometimes not offered at the same time by the same provider but women could be referred for the services to another health worker within the same premises.

From what was observed at the facilities, shortcomings such as two different health workers giving two different health education talks to the same audience, testing for HIV and syphilis separately and syphilis treatment offered by different health worker from the one who is dispensing ART to HIV-positive women, could be easily rectified without extra resources. A full integration of the two services is critical in order to deal with issues such as long waiting hours in the clinics.

Availability of trained and motivated health workers is crucial for the successfulness of the programmes. A small proportion of health workers who participated in this study reported receiving training in basic components of the programmes. Unavailability of trained staff has been documented as an obstacle for integrated services [114].

Independent policies for the implementation of these two programmes in Tanzania needs to be reconsidered. The absence of integrated services guidelines and protocols is a challenge for direct service providers (providers at the facility level). For example in our study we found that women who attended ANC in private ANC facilities were at a higher risk of failure to receive PMTCT interventions compared to women who attended ANC at public ANC facilities, while this was not the case for syphilis screening. If syphilis screening is implemented in private ANC facilities, we need to understand why HIV testing is rarely done in these facilities.

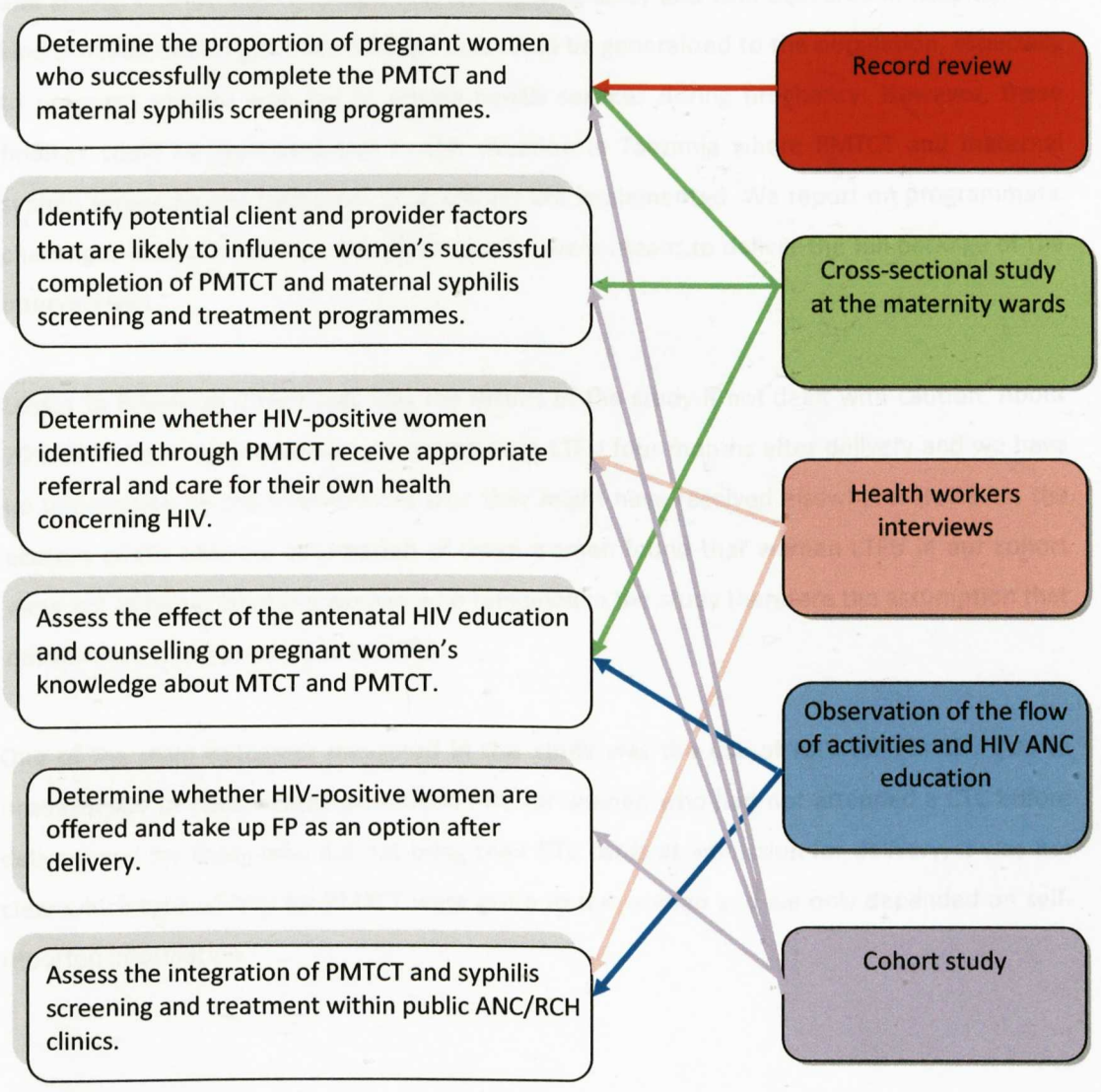
We are also reporting a total failure of the implementation of maternal syphilis screening and treatment programme at the maternity wards in Mwanza city. This study was not designed to explore the causes of these failures. However, in future it will be helpful to understand why pregnant women admitted to hospital for delivery and who were not screened for syphilis during pregnancy are not screened at admission for delivery and why RPR positive women and their infants do not receive any interventions to prevent congenital syphilis before discharge from the hospital after delivery/birth while PMTCT services are being offered. The absence of integrated maternal syphilis screening and PMTCT policies hamper the successful implementation of the programmes.

11.2 Study design and strength

The major strengths of this study include the use of multiple data sources, which increased the validity of the study findings by allowing different source of information to feed into different specific objectives of the study as illustrated in Figure 11-1. The details for this figure were also given on Table 4-1.

More than one method was use to address all the specific aims of the study, except aim 5, which was to determine whether HIV-positive women are offered, and take up FP as an option after delivery. For this objective, only cohort data were used.

Figure 11-1 Link between the study specific objectives and the data collection methods



The broad aim of the study was to assess the operational performance of two key maternal and reproductive health programmes in Mwanza City. The findings and the recommendations from this research will inform policy makers on the performance of the programmes and the factors that hinder the successfully implementation and how best these two programmes could be integrated to improve their effectiveness.

Information for this research was obtained from the service providers as well as the services users. This gave an insight on the barriers to the performance of the programmes.

11.3 Limitations of the study

This study was designed to be conducted in health facilities that were located in Mwanza City and among women who attended ANC during pregnancy and who delivered in hospital. This kind of study cannot generate findings that could be generalized to the population, especially to pregnant women who fail to attend health services during pregnancy. However, these findings could be representative to the situation in Tanzania where PMTCT and maternal syphilis screening and treatment programmes are implemented. We report on programmatic challenges in health facilities that theoretically, were meant to deliver the full package of the interventions.

Losses to follow-up (LTFU) may bias the results of the study if not dealt with caution. About 20% of HIV-positive women in our cohort were LTFU four months after delivery and we have no information on the interventions that they might have received elsewhere. However, the analysis of the baseline information of these women found that women LTFU in our cohort were not different from the women who remained in the study therefore the assumption that our results are not biased due to LTFU.

One of the main outcomes measured in this study was the use of ARV for PMTCT. Due to unavailability of documented prescribed ARV for women who had not attended a CTC before delivery and for those who did not bring their CTC cards at admission for delivery, it was not clear which type of ARV for PMTCT were given to the woman and we only depended on self-reported information.

Selection of the health workers to participate in the health workers interviews was designed to include as many health workers in the maternity wards and in the ANC clinic as possible. However, few senior health workers (Medical doctors (MD) and Assistant Medical Officers (AMO)) participated in these interviews due to other commitments. On the other hand, junior staffs are often the first contact of the health worker with pregnant women and the information obtained from them therefore represents the actual situation in these facilities.

Measuring the maternal to infant transmission rates of HIV and syphilis are the ideal primary outcome measures for evaluating the success of PMTCT and maternal syphilis screening and treatment programmes. However, due to the study logistics, budget constraints and design of the PMTCT and syphilis programmes activities it was not possible to determine the mother- to-child transmission rates of the two infections in this study.

CHAPTER 12: CONCLUSIONS AND RECOMMENDATIONS

While PMTCT and maternal syphilis screening and treatment are key maternal and reproductive health interventions, these two programmes still face a significant challenge in Tanzania. We reported on several missed opportunities among pregnant women who had opportunity to attend for ANC during pregnancy and who delivered in hospitals in Mwanza city. Missed opportunities regarding PMTCT ranged from HIV testing at ANC or at the maternity ward to counselling on, and adhering to, infant feeding choices. Drop out in the different steps of PMTCT intervention programme is high. Only 41% of HIV-positive women in our study successfully completed the PMTCT interventions. This study found that both RPR-positive women who were not treated at ANC and all infants born to RPR-positive women were not treated at the maternity ward.

Lower education levels, attending less than three ANC visits during pregnancy, attending private ANC facilities and failure to attend CTC before delivery were found to be the factors that contributed to the failure in completing various PMTCT interventions. In addition, this study found that attending less than three ANC visits during pregnancy and attending ANC clinics located outside Mwanza city was significantly associated with failure to screen for syphilis during pregnancy.

This study found that the maternity wards did not offer any services to prevent congenital syphilis and while PMTCT services were available in the study hospital maternity wards, about 20% of pregnant women who delivered in these study hospitals did not receive HIV testing for PMTCT.

Women who were tested and found to be HIV-positive at the maternity wards and half of the HIV-positive women tested at ANC were not referred to a CTC. Also about 50% of women who were referred to CTC before delivery did not attend a CTC.

In order to improve the uptake of HIV testing for PMTCT and maternal syphilis screening in order to treat women to prevent congenital syphilis effectively, pregnant women should be encouraged to attend ANC clinics early in pregnancy. This could be achieved by continued promotion of early attendance to ANC (i.e. attending ANC during first trimester of pregnancy) through local mass media (radio and television). Posters promoting early ANC attendance

during pregnancy and male partner involvement should be displayed in all government departments. Community mobilisation events need to be considered and these should aim at addressing different myths that hinder early attendance to ANC facilities during pregnancy in many African communities such as a belief that talking about or revealing a pregnancy that is not physically seen could lead to poor pregnancy outcomes (such as miscarriage)[147].

It is highly recommended that all pregnant women attending ANC at least once during the current pregnancy should be offered HIV education, counselling and testing for PMTCT, and those found to be HIV-positive should receive ARV for PMTCT and referral to CTC for their own health before leaving the ANC facility. In addition, women should be screened for syphilis and those found to be RPR positive should be treated on the same day of their first visit. This is of critical importance in order to improve the uptake of these services since a high proportion of pregnant women in our communities attend ANC at least once during pregnancy. However, it is crucial that women who miss HIV and/or syphilis testing or treatment during the first ANC visit should be identified and offered the test and/or treatment at the next ANC visits. This could be done simply reviewing the ANC cards of pregnant women on repeat visits.

Furthermore, we found that syphilis prevalence in our study was 5.9%, and Swai *et al* on the surveillance study of HIV and syphilis infections reported a syphilis prevalence of 7.3% among antenatal clinic attendees in Tanzania [110]. Based on these findings and the fact that in Tanzania Benzathine penicillin is not always available in the ANC facilities offering these services, we would not recommend treating all women during pregnancy.

Performance of PMTCT and congenital syphilis prevention programmes need to be improved at the maternity ward for women who failed to access these services during the antenatal period and for those in need of after-delivery interventions (counselling and prophylaxis treatment for infants). There is an urgent need of integration of PMTCT and syphilis screening and treatment services in the maternity wards. This could be attained by strengthening the current PMTCT sections in the maternity ward so that at least all women who delivery in hospital benefit fully from these interventions. Efforts to strength the maternity ward PMTCT sections should include: -

1. Training of health workers in PMTCT and syphilis testing and treatment.
2. Providing screening for syphilis to
    a. Women who were not screened at ANC
3. Providing syphilis treatment to
    a. RPR positive women not treated at ANC
    b. Infants born to RPR positive women
4. Increase the availability of resources e.g.
    a. Test kits for both HIV and syphilis
    b. ARV dugs for PMTCT for both mothers and infants
    c. Benzathine penicillin for RPR positive women not treated during pregnancy and for infants whose mothers tested RPR positive during pregnancy
    d. Register books and referral forms
5. Availability of dedicated, well trained health workers during all shifts.

Research on innovative technologies to diagnose HIV and syphilis would be useful in order to improve the performance of these two programmes both at ANC and at the maternity ward. These should include research on combined treponemal and non-treponemal test in a form of a rapid test or POC assay that could be used in ANC clinics or in the maternity ward for syphilis screening. There is an urgent need for scientists to consider the innovation of a POC test that can detect both syphilis and HIV. This will reduce the time pregnant women spend in accessing these services and the number of staff required to offer the services.

An assessment of the woman's ANC card at admission in the maternity ward should aim at identifying pregnant women in need of syphilis screening or treatment and any of the PMTCT interventions and help these women to adhere to the recommended guidelines. For example, women not tested at ANC should be counselled and offered the test, women who tested HIV-positive at ANC should be asked about the medication and if they have been prescribed ARV, if not, they should be given ARV prophylaxis for PMTCT. Infants born to HIV-positive and/or RPR positive women should be given ARV prophylaxis or treated for congenital syphilis respectively.

It is important that at admission and before discharge from the hospital after delivery, HIV-positive women should be asked about their attendance at a CTC for their own health, and if

they have never attended or they were tested at the maternity ward, they should be counselled on the importance of attending a CTC. Required information on where and how they can access CTC services should be provided and a referral form to a preferred CTC clinic should be completed for them.

There is a need for longitudinal follow up of mothers and infants to ensure that they receive quality care after discharge from the maternity ward. The mothers of all HEI should be given their infant's MCH cards (which records the infants' health monitoring information during attendance at the under-five clinics) before leaving the maternity wards to allow PMTCT interventions to be recorded in their MCH card at birth. This information will therefore be available for service providers at the under-five clinics who will be required to offer subsequent services such as infant diagnosis or provision of cotrimoxazole prophylaxis.

There is also a need to improve the infants' MCH card to incorporate information on mothers' syphilis results and action taken to prevent congenital syphilis for all infants of RPR positive women. This will prompt service providers at the under-five clinics to identify and, when necessary, treat infants born to RPR positive mothers.

Private providers should be involved in the implementation of PMTCT in order to improve the uptake of HIV testing for PMTCT. It should be made compulsory that health workers in the private health sector receive training in PMTCT components. Procurement of the HIV test kits and ARVs for PMTCT could be done through the Ministry of Health and Social Welfare, so that HIV testing is offered for free in the private clinics to encourage women to take up the test without extra cost. This has worked very well for the various under-five children vaccines in private under-five clinics in Tanzania. All vaccines used in private under-five clinics are procured through the Ministry of Health and Social Welfare and offered to children free of charge.

To improve counselling for PMTCT interventions uptake, women with low educational level should be targeted for more detailed information and education and should be encouraged to attend ANC regularly. Specifically, when counselling about infant feeding, there is a need to stress the importance of exclusive breast-feeding (EBF), using simple terminologies. Using pictorial diagrams should help the women to clearly understand the meaning and full benefits

of EBF. Women should also be educated on how to produce enough breast milk for the infant. Counselling on infant feeding should be done during each antenatal visit so that HIV-positive women are well informed before delivery.

Women who attended the ANC HIV education sessions were more knowledgeable about HIV, MTCT and PMTCT and were more likely to have had an HIV test when compared to women who did not attend. However, women's participation in these sessions was found to be poor. Introducing innovative ways of making the ANC HIV health education an interesting session to pregnant women at ANC is an urgent requirement. These could include starting a talk with a quick drama, self-introductions, a short story, a real case study or pictorial illustration (or video clips when possible) of case studies.

PMTCT programs are key entry points to HIV care and treatment and this research found that HIV-positive women who attended a CTC before delivery were more likely to adhere to the various PMTCT interventions compared to women who did not attend. Furthermore, while PMTCT services are integrated in maternal-child health services, HIV adult care and treatment programs often function in parallel and as a result, HIV-positive women in Mwanza city are required to navigate separate health care facilities in order to access the required services for their own care. Therefore, integrating HIV care and treatment into PMTCT is required to facilitate the initiation of ARV treatment during pregnancy to women who require treatment, and provision of effective ARV prophylaxis for PMTCT. Strategies that could be considered include:-

1. Training the PMTCT health workers in ANC and in the MCH clinics in HIV clinical staging and CD4 testing. This will allow HIV-positive pregnant women identified through PMTCT to quickly be introduced to care and treatment.
2. Further research on the use of peer counsellors and expert patients' is needed. Peer counsellor/expert patients' could be HIV-positive women who have been through PMTCT and referral procedures and who receive basic training in counselling and in different PMTCT interventions and referral procedures to CTC. These can be hired by the clinics as lay counselors and they could assist in adherence counseling and breastfeeding counseling and support. Also they could assist in accompanying new patients to the CTC.

Half of the HIV-positive women in our cohort reported unwanted pregnancies and more than 20% of them reported that they had not received any counselling on family planning (FP) since they were tested and found to be HIV-positive up to four months after delivery. This indicates that the PMTCT services missed an opportunity to provide FP to these women. There is an urgent need to improve FP counselling and availability for HIV-positive women during the antenatal period, at delivery, before discharge from the hospital and during the postpartum period. We reported that a higher proportion of HIV-positive women in this study reported abstaining from sexual activity for more than 16 weeks after delivery. This gives them multiple opportunities at MCH visits to discuss FP and provide this before women resume sexual activity.

In summary, PMTCT and syphilis screening and treatment programmes are key interventions to improve reproductive, maternal and child health in Tanzania. To improve the performance of these programmes and to improve maternal and infant health there is an urgent need of integration of these two programmes at all levels. Pregnant women should be encouraged to attend ANC early in pregnancy in order to benefit from these interventions. Training of health workers on programme components and updates are vital to the success of the programmes.

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LIST OF ANNEXES

Annex 1: ANC-HIV health education observation checklist

Annex 17: Implementation of PMTCT & Maternal Syphilis Screening and Treatment in Mwanza City

Checklist - Observation of the group education talks on HIV testing and counselling for PMTCT uptake

	Section A: Background information		
1.1	Date of Observation		|_|_|/|_|_|/|_|_|
1.2	Observer's code		|_|_|
1.3	Name and code of the RCH clinic		|_|_|_|
1.4	Total number of participants in a group		|_|_|
1.5	Language used		|_|_|
1.6	Language used agreed by the group?	*1=Yes; 2 =No*	|_|
1.7	Group structure	*1=Circle; 2=Teacher/class model*	|_|
	Section B: Observation of the main functions ***1=not done; 2 =done but not complete; 3=well done; 8=NA***		
2	**Establishing group relationship**		
2.1	Greets participants		|_|
2.2	Introduce self		|_|
2.3	Facilitate group introduction		|_|
3	**Ensuring group participation**		
3.1	Allow all members to participate		|_|
3.2	Seeks clarification about information given or discussed		|_|
3.3	Directs discussion appropriately		|_|
3.4	Summarizes main issues discussed		|_|
4	**Giving information**		
4.1	Gives information in clear and simple terms		|_|
4.2	Gives participants time to absorb information and to respond		|_|
4.3	Has up-to-date knowledge about HIV/MTCT		|_|
4.4	Repeats and reinforces important information		|_|

Annex 17: Implementation of PMTCT & Maternal Syphilis Screening and Treatment in Mwanza City

Checklist - Observation of the group education talks on HIV testing and counselling for PMTCT uptake

4.5	Checks for understanding and mis-understanding	__
4.6	Summarizes main issues	__
5	**Handling special circumstances**	
5.1	Accommodates language difficulty /differences in the group	__
5.2	Talks about sensitive issues plainly and appropriately for culture /group composition	__
5.3	Prioritize issues to cope with limited time	__
5.4	Manages participants' distress	__
	Section C: Topic covered ***1=Not mentioned; 2 =Mentioned but not in details; 3 =Mentioned in details***	
6	**HIV related issues covered during the talk**	
6.1	Knowledge about HIV and transmission	__
6.2	Misconceptions about HIV transmission	__
6.3	The HIV testing process	__
6.4	The window period	__
6.5	The meaning and possible implication of HIV positive and HIV negative results	__
6.6	The value of getting partner involved	__
6.7	Potential needs and available support	__
7	**MTCT related issues**	
7.1	Full information about HIV in pregnancy and risk of transmission to the infant	__
7.2	Possible benefits of knowing HIV status and interventions available if positive	__
7.3	Testing is not mandatory and antenatal care and other services will not be denied if mother decide not to be tested	__
7.4	ARV therapy is not a cure/treatment for mothers	__
7.5	The need to attend maternity services regularly	__
7.6	Known adverse effects and drug interactions	__

Annex 2: Ethical approval-LSTHM

LONDON SCHOOL OF HYGIENE
& TROPICAL MEDICINE

ETHICS COMMITTEE

APPROVAL FORM
Application number: 5337

Name of Principal Investigator	**Rebecca Balira**
Department	**Infectious and Tropical Diseases**
Head of Department	**Professor Simon Croft**

Title: **Implementation of Prevention of Mother-to-Child Transmission of HIV and Maternal Syphilis Screening and Treatment Programmes in Mwanza Region, Tanzania: Uptake and Challenges**

This application has been approved by the Committee

Chair
Professor Tom Meade

Date ..... 8 July 2008

Approval is dependent on local ethical approval having been received.

Any subsequent changes to the consent form must be re-submitted to the Committee.

Annex 3: Ethical approval-MRCC-Tanzania

THE UNITED REPUBLIC OF
TANZANIA

National Institute for Medical Research
P.O. Box 9653
Dar es Salaam
Tel: 255 22 2121400/390
Fax: 255 22 2121380/2121360
E-mail: headquarters@nimr.or.tz

Ministry of Health and Social Welfare
P.O. Box 9083
Dar es Salaam
Tel: 255 22 2120262-7
Fax: 255 22 2110986

NIMR/HQ/R.8a/Vol. IX/707

01st July 2008

Ms Rebecca Balira
NIMR Mwanza
P O Box 1462, MWANZA
Tanzania

CLEARANCE CERTIFICATE FOR CONDUCTING MEDICAL RESEARCH IN TANZANIA

This is to certify that the research entitled: Implementation of Prevention of Mother-to-Child Transmission of HIV and Maternal Syphilis Screening and Treatment in Mwanza region: Uptake and Challenges. (Balira R *et al*), has been granted ethics clearance to be conducted in Tanzania.
The Principal Investigator of the study must ensure that the following conditions are fulfilled:

1. Progress report is made available to the Ministry of Health and the National Institute for Medical Research, Regional and District Medical Officers after every six months.
2. Permission to publish the results is obtained from National Institute for Medical Research.
3. Copies of final publications are made available to the Ministry of Health and the National Institute for Medical Research
4. Any researcher, who contravenes or fails to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine.

Name: Dr Andrew Y Kitua

Signature

CHAIRMAN
MEDICAL RESEARCH
COORDINATING COMMITTEE

Name: Dr Deo M Mtasiwa

Signature

CHIEF MEDICAL OFFICER
MINISTRY OF HEALTH, SOCIAL WELFARE

CC: RMO
DMO

Annex 4: Cohort recruitment informed consent (English version)

Introduction:

The National Institute for Medical Research, Mwanza Centre in collaboration with the London School of Hygiene and Tropical Medicine, The Mwanza Regional Medical Office, The Municipal Health Office, Bugando Medical Centre and Sekou-Toure Regional Hospital, is finding out how successful are the two services offered to pregnant women to prevent the transmission of HIV and syphilis infections from the mothers to their unborn babies during pregnancy, delivery and postnatal period within maternity wards in Mwanza City.

Why are we doing this study?

Studies have shown that most children who are HIV positive acquired the infection form their mothers either during pregnancy, at delivery or through breastfeeding. About 10% of Infants born to HIV positive mother acquire HIV during pregnancy, 20% acquire HIV during delivery and 20% acquire the infection through breastfeeding. The introduction of prevention of mother to child transmission of HIV (PMTCT) services in Tanzania is anticipated to reduce mother to child transmission of HIV through giving ARV drugs to the mothers before delivery and to the infants immediately after delivery. Women are also educated on appropriate infant feeding. We want to know how many women successfully complete the PMTCT services, to understand why some of them do not complete the programme and also the consequences of not completing the programme.

What are you expected to do

Today we will talk about the study and you will be asked whether you would like to join the study. If you agree to participate in this study, we will ask you some questions about yourself and the services you received during pregnancy before admission for delivery. We will not take women into the study if they are not going to stay in Mwanza city for at least four months after delivery. This is because we are recruiting women today and we are asking them to see us at the MCH clinic every month over a period of four months. If you agree and will be staying in Mwanza city after delivery for the period mentioned above, we will give you a study identity card which will show that you have joined the study. Then we will ask you more questions on the services you received at the maternity ward and your plans for the MCH visits for your baby. This will take about half an hour (30 min) of your time.

What you will be expected to do at the follow-up visits

I you agree to participate in this study we will ask you to bring your baby to the MCH clinic visits as scheduled on his/her immunization (road to health) card every month. At these visits, for the first four months, after the normal procedure of immunization we will see you and ask you few questions about yourself and your baby and this will always take about half an hour (30 min) of your time. If you will not be able to attend at the MCH clinic as scheduled, one of us, researchers will try and visit you at home to see how are you progressing with the baby, and why you did not attend to the clinic, however this will be done if and only if you will allow us to visit you at home.

Confidentiality

Everything you tell us will be kept secret. We are not going to record your name or your baby's name anywhere on the form we are using to ask you the questions. Your name will only be written on one form that has the details of where you live. This will be locked safely in our office, and will be used to trace you in case we miss you at the clinic during your scheduled visit. This information you are giving us will be used only for the purpose of the study.

Participation

We hope you will agree to participate in this study. Remember your participation in this study is voluntary and is completely your decision. If you do accept you still have the right to withdrawal your participation if you change your mind at any time. However, we would be grateful if you can spare the time to come for the follow-up and complete the interviews to allow us to get the required information from you.

Action

Please read this paper carefully and take it home with you. If you have any questions, please ask one of the project staff at any time. If you want to join the study, you will be asked to sign a special form agreeing that you would like to participate.

For more questions

If you have any more questions after leaving this place, please contact any member of the project staff or the Principal investigator Ms Rebecca Balira, Mwanza Medical Research Centre, P O Box 1462, Mwanza, Tanzania;

Informed consent form

Cohort recruitment

Study ID sticker here

1. I have read the information sheet (or it has been read to me) that explains the objectives of the study and all the procedure that I am being asked to participate in
2. All questions I had about this study have been answered
3. I clearly understand what I will be required to do if I agree to participate in this study
4. I have understand and (**agreed/refused**) to be visited at home by one of the researchers if I fail to attend my appointment at the clinic.
5. I also understand that I have the right to refuse to participate or withdrawal from the study at any time if I don't want to continue and that my right of care at this or another health facility won't be compromised
6. I am aware that all information I give will be kept confidential
7. I agree to participate in this study

Name of participant_____

Signature of participant/Finger print_____

Date _____

Name of Witness_____

Signature of Witness_____

Date _____

Annex 5: Cohort recruitment informed consent (Swahili version)

Utangulizi:

Taasisi ya Utafiti wa Magonjwa ya Binadamu, Kituo cha Mwanza, tukishirikiana na Chuo kikuu cha London, Ofisi ya Afya Mkoa wa Mwanza, Ofisi ya Afya, Jiji la Mwanza, Hospitali ya Rufaa ya Bugando na Hospitali ya Mkoa, Sekou-Toure; tunataka kujua kama akina mama wajawazito wanapata taarifa za kutosha kuhusu, ni namna gani wanaweza kukinga maambukizi ya UKIMWI na kaswende kwa watoto wao pale wanapohudhuria kliniki kwa uchunguzi wakati wa ujauzito, na pale wanapojifungua, kama wamejifungua hospitalini. Vile vile tunataka kujua kama huduma zinazotolewa kwa wanawake kuzuia maambukizi ya magonjwa haya kwa watoto zinafanya kazi vizuri katika jiji la Mwanza.

Kwa nini tunafanya utafiti huu

Tafiti zinaonyesha kwamba watoto wengi wenye UKIMWI wameambukizwa na mama zao, aidha wakati wa ujauzito au wakati wa kujifungua au wakati wa kuwanyonyesha. Kwa wastani watoto watatu hadi wanne kati ya kumi waliozaliwa na mama wenye virusi vya UKIMWI, huwa wanaambukizwa virusi hivyo. Kuna huduma mbali mbali za afya ambazo zinatolewa kwenye kliniki ya ujauzito na wakati wa kujifungua zinazoweza kusaidia kupunguza tatizo hili. Hizi huduma zinahusisha, upimaji wa UKIMWI wakati wa ujauzito, kumpatia mama mjamzito aliyeathirika madawa ya UKIMWI wakati wa ujauzito na/au wakati wa kujifungua na kuwapatia watoto wao dawa za UKIMWI mara tu wanapozaliwa. Vilevile mama walioathirika wanapewa mafundisho na ushauri wa namna ya kuwalisha watoto wao ili kupunguza hatari ya maambukizi ya Virusi vya UKIMWI kwa watoto kupitia maziwa ya mama. Tunataka kujua ni akina mama kiasi gani wanapatiwa na wanakubali kutumia huduma hizi za kukinga maambukizi ya UKIMWI na kaswende kwa watoto wakati wa ujauzito na wakati wa kujifungua. Vile vile tunataka kujua ni nini kinachotokea kwa mama na mtoto wanaporuhusiwa kurudi nyumbani baada ya kujifungua hospitalini. Na ni wangapi wanakamilisha hatua mbalimbali za huduma hizi katika kliniki baada ya mtoto kuzaliwa. Hii itatusaidia kujua ni kwanini akina mama wengine wanashindwa kupata huduma hizi kikamilifu, na itatuwezesha kubuni njia ya kuboresha huduma hizi ili kuboresha afya ya mama na kuwakinga watoto na maambukizi ya UKIMWI na kaswende.

Ni nini unatarajiwa kufanya

Leo tutaongea na wewe kuhusu utafiti huu na tutakuuliza kama utapenda kushiriki kwenye utafiti. Kama utakubali kushiriki kwenye utafiti huu, tutakuuliza maswali kadhaa kukuhusu wewe binafsi na huduma ulizopatiwa wakati wa ujauzito kabla ya kulazwa hospitalini kwa ajili ya kujifungua. Katika utafiti huu hatutawashirikisha akina mama ambao hawatakaa katika jiji la Mwanza angalau miezi minne baada ya kujifungua. Hii ni kwa sababu tunaandikisha akina mama leo na tunawaomba watuone tena wakati wa kliniki ya mama na mtoto kila mwezi kwa muda wa miezi minne. Kama utakubali kushiriki na kama wewe utakuwepo hapa jijini baada ya kujifungua kwa muda huo tulioutaja hapo juu, tutakupatia kitambulisho kuonyesha kuwa umejiunga na utafiti huu. Kisha tutakuuliza maswali zaidi kuhusu huduma ulizopatiwa ulipohudhuria kliniki ya mama wajawazito na zile ulizopata hapa wakati wa kujifungua na mipango uliyonayo kuhusu mahudhurio ya kliniki ya mama na mtoto. Haya mahojiano yatachukua kama nusu saa ya muda wako.

Kama wakati wa ujauzito hukupimwa kaswende, tutachukua damu kutoka kwako na tutakufanyia kipimo cha kaswende leo. Hautahitaji kulipia huduma hii. Kama tukikuta una kaswende, tutawapatia wewe na mwanao matibabu ya kaswende ambayo ni sindano moja moja. Hii haitakugharimu kitu na itafanyika aidha hapa kabla hujaondoka hospitalini au tutakupeleka kliniki ambapo utapata matibabu bure endapo tutapata majibu ya kipimo mapema. Kama majibu yatachelewa na ukaruhusiwa kwenda nyumbani, basi tutalazimika kukufuata nyumbani kukupatia majibu yako na kuwapeleka wewe na mwanao kliniki ili mpatiwe matibabu bure. Kama utakutwa na kaswende tunaweza vile vile kumtibu na mume/mpenzi wako. Kipimo hiki cha damu hakitatumika kupima magonjwa mengine yoyote.

Ni nini unatarajiwa kufanya wakati wa ufuatiliaji kwenye kliniki ya mama na mtoto.

Ikiwa utakubali kushiriki katika utafiti huu, tutakuomba umlete mtoto wako kliniki kama inavyoonyeshwa kwenye kadi yake ya kliniki kila mwezi. Wakati huo kwa miezi minne mfululizo baada ya kujifungua, kila baada ya taratibu za kawaida za kliniki na chanjo tutaonana na wewe na kukuuliza maswali kukuhusu wewe binafsi na vilevile kuhusu mtoto wako. Hii kila mara itachukua kama nusu saa ya muda wako. Kama hautaweza kufika kliniki kwa siku ulizopangiwa, mmoja wetu (watafiti) atajaribu kukutembelea nyumbani kujua unaendeleaje wewe na mtoto na kujua kwa nini hukuweza kufika kliniki, hii itafanyika endepo tu utakuwa umeturuhusu kukutembelea nyumbani.

Usiri

Kila jambo utakalotueleza litatunzwa kwa siri. Hatutaandika jina lako au jina la mtoto wako mahali popote katika karatasi ya mahojiano. Jina lako litaandikwa tu kwenye karatasi yenye taarifa za mahali unapoishi. Hiyo fomu itatunzwa kwa siri mahali salama huko ofisini kwetu na itatumika tu iwapo tutahitaji kukufuatilia nyumbani baada ya kukukosa kliniki unapotakiwa kufika au kama utakuwa unahitaji matibabu kwa ajili ya kaswende. Hizi habari unazotupatia zitatumika kwa ajili ya makusudi ya utafiti huu tu.

Ushiriki

Tunaamini utakubali kushiriki katika utafiti huu. Kumbuka ushiriki huu ni wa hiari na ni uamuzi wako mwenyewe. Kama ukikubali kushiriki bado unayo haki ya kuamua kuacha kama utabadili mawazo yako wakati wowote. Hata hivyo tutashukuru kama utaweza kupata muda wa kuja kliniki wakati wa ufuatiliaji na kujibu maswali yetu ili kutuwezesha kupata taarifa tunazozihitaji kutoka kwako.

Cha kufanya

Tafadhali soma karatasi hii kwa makini na uende nayo nyumbani. Kama unayo maswali yoyote tafadhali muulize mhusika yeyote katika utafiti huu wakati wowote. Kama unataka kujiunga na utafiti, utaombwa kuweka sahihi kwenye fomu maalumu kukubali kwamba ungependa kushiriki

Kwa maswali zaidi

Kama unayo maswali zaidi baada ya kuondoka mahali hapa tafadhali wasiliana na mfanyakazi yeyote wa mradi au mtafiti mkuu Ndugu Rebecca Balira, Kituo cha Utafiti wa Magonjwa ya Binadamu Mwanza SLP 1462, Mwanza, Tanzania; Simu: 255 28 2503012

Consent form: Cohort recruitment

Study ID sticker here

1. Nimesoma/Nimesomewa maelezo muhimu yanayoelezea madhumuni ya utafiti huu na maelekezo ya jinsi nitakavyoweza kushirikishwa.
2. Maswali yote niliokuwa nayo kuhusu utafiti huu yamejibiwa
3. Ninaelewa vizuri ni kitu gani nitatakiwa kufanya kama nitakubali kushiriki katika utafiti huu.
4. Nimeelewa na **(nimekubali/nimekataa)** kufuatwa nyumbani na mmoja wa watafiti kama nitashindwa kufika kliniki ninapotakiwa
5. Vile vile ninaelewa kuwa ninayo haki ya kuacha kushiriki katika mahojiano haya wakati wowote ninapojisikia kufanya hivyo na kwamba haki yangu kupata huduma mahali hapa haitaathirika kwa sababu hiyo
6. Ninaelewa kwamba maelezo yote niliyoyatoa yatatunzwa kwa siri.
7. Ninakubali kushiriki katika utafiti huu.

Jina la Mshiriki_____

Sahihi ya Mshiriki _____ Alama ya dole gumba

Tarehe _____

Jina la shuhuda_____

Sahihi ya shuhuda_____ Alama ya dole gumba

Tarehe _____

Jina la mtafiti_____

Sahihi ya Mtafiti_____

Tarehe _____

Annex 6: Care and treatment card

MAHUDHURIO

Tarehe	Dawa zilizotolewa	Jumla ya siku	CD4 count (% <6 yr)	Namba ya kituo	Jina la mtoa dawa	Tarehe ya kurudi
__/__/__						__/__/__
__/__/__						__/__/__
__/__/__						__/__/__
__/__/__						__/__/__
__/__/__						__/__/__
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__/__/__						__/__/__
__/__/__						__/__/__

Taarifa muhumu ya mteja (ijazwe na mganga)

__/__/__	
__/__/__	
__/__/__	
__/__/__	
__/__/__	
__/__/__	

Namba ya utambulisho: _____

Jina kamili _____

Tarehe ya kuzaliwa __/__/__ siku mwezi mwaka

Jinsia ☐ Me ☐ Ke

Matibabu ya ARV tangu __/__/__ siku mwezi mwaka

Simu ya mgonjwa _____

Wilaya _____

Tarafa _____

Kata _____

Mtaa/kijiji _____

Mwenyekiti wa Mtaa /Kijiji/Kitongoji _____

mjumbe / Balozi _____

Mkuu wa kaya _____

Jina la msaidizi wa kambu _____

Simu _____

Anuani ya Msaidizi wa kambu _____

Idadi ya kadi alizokwishapata ☐1☐2☐3☐4☐5

JAMHURI YA MUUNGANO WA TANZANIA
WIZARA YA AFYA NA USTAWI WA JAMII

CTC 1: KADI YA UTAMBULISHO
(ONYESHA KADI HII KATIKA KILA HUDHURIO)

Namba ya faili ya kituo _____ JINA LA KITUO_____ Simu ya kituo _____

Namba ya faili ya kituo _____ JINA LA KITUO_____ Simu ya kituo _____

Namba ya faili ya kituo _____ JINA LA KITUO_____ Simu ya kituo _____

Namba ya faili ya kituo _____ JINA LA KITUO_____ Simu ya kituo _____

Annex 7: Patient referral form

MINISTRY OF HEALTH AND SOCIAL WELFARE

NATIONAL HIV CARE AND TREATMENT

PATIENT REFERRAL / TRANSFER FORM

DATE: .....

REFERRAL FROM: FACILITY NAME ..... FACILITY CODE .....

REFERRAL TO: FACILITY NAME .....

NAME: FIRST ..... MIDDLE ..... LAST .....

DATE OF BIRTH: ...../...../..... CURRENT AGE: ..... SEX: ☐ M ☐ F

REASON FOR REFERRAL/TRANSFER: .....

ART START DATE: ...../...../..... UNIQUE CTC ID#: .....

AT START OF ART:

WEIGHT ..... FUNCTION ..... CLINICAL STAGE ..... CD4 .....

CURRENT STATUS - DATE ...../...../.....

WEIGHT ..... FUNCTION ..... CLINICAL STAGE ..... CD4 .....

ORIGINAL FIRST LINE REGIMEN: .....

1ST SUBSTITUTION: ..... DATE ...../...../..... WHY .....

2ND SUBSTITUTION: ..... DATE ...../...../..... WHY .....

SECOND LINE REGIMEN: ..... DATE ...../...../..... WHY .....

CURRENTLY ON TB TREATMENT? YES NO ..... IF YES, DATE STARTED: .....

OTHER RELEVANT MEDS (Including INH, CTX, Diflucan): .....

DRUG ALLERGIES: .....

CURRENTLY PREGNANT? ☐ YES ☐ NO IF YES, EDD: .....

OTHER RELEVANT CLINICAL NOTES: .....

.....

NAME, SIGNATURE AND STAMP .....

Medical
P.O. Box 132 Mwanza

FEEDBACK SECTION

Services Provided: To be filled out by the organization providing the requested service

Date:

Patient Name:	**Date of Birth/Age:**

Services Provided:

- ☐ Services provided: _____
- ☐ Services completed as requested _____ Yes _____ No
- ☐ Follow-up needed: services: _____ _____ _____ Date for follow-up: _____

Additional Comments:

Name of Organization/Health Facility:	**Contact Person/referral focal person:** *Name:*

Annex 8: Cohort tracing information

Annex 7: Implementation of PMTCT and maternal syphilis screening in Mwanza city
Cohort Recruitment –Tracing Information

1.14	1st neighbour on right	_____	
1.15	1st neighbour on left	_____	
1.16	Type of the house ***If 2=renting the whole house or 3 =renting a room in a house ask q1.17 otherwise skip to q.1.18***	Own house Renting the whole house Renting a room in a house Living with family Renting a flat Other(specify)_____	1 2 3 4 5 6
1.17	Owner of the house	_____	
1.18	Head of the household	_____	
1.19	Description of route to the house		
	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____		

Cohort recruitment-Tracing form –English – final version (09/10/2008)

Annex 7: Implementation of PMTCT and maternal syphilis screening in Mwanza city
Cohort Recruitment –Tracing information

1.20	Description of the house including colour of the door		
	_____ _____ _____ _____ _____ _____ _____ _____		
1.21	Name and code of the ANC attended during pregnancy	|_____|	|__|__|__|
1.22	Name and code of the MCH clinic where the mother intends to attend for the under five clinic	|_____|	|__|__|__|
1.23	Next appointment date at the under five clinic		|__|__|/|__|__|/200|__|
Interviewer please discuss with the woman about the home visit if not seen at the under five clinic			
1.24	Has the participant agreed to be visited at home	(Circle one)	**Yes** 1 **No** 2
1.25	Care and treatment clinic where the participant intends to attend for her own health	(Circle one) **Other (specify)**_____	**BMC** 1 **STRH** 2 3

Cohort recruitment-Tracing form –English – final version (09/10/2008)

Annex 9: Knowledge questions from the cross-sectional questionnaire

Annex 8: Implementation of PMTCT and maternal syphilis screening in Mwanza city
Cross-sectional questionnaire-Maternity ward (Knowledge questions only)

4	**Section D: Knowledge about HIV/AIDS**				
Now I am going to ask you few questions about HIV/AIDS, this is to help us understand what pregnant women know about this problem					
4.1	Is there anything a person can do to avoid getting HIV, the virus that causes AIDS? *If 2=No skip to q 4.3*	*(Circle one)*		Yes	1
				No	2
4.2	Do you know how people can protect themselves from being infected with HIV?	*(Circle 1=mentioned for all that are mentioned)*	*Mentioned*	*Not Mentioned*	*NA*
		Condom use	1	2	8
		Have few or one partner(s)	1	2	8
		Both partners have no other partners	1	2	8
		No casual sex	1	2	8
		No sex at all	1	2	8
		Avoid infections with contaminated (used) needles	1	2	8
		Avoid blood transfusion	1	2	8
		Circumcision	1	2	8
		STD Treatment	1	2	8
		Not sharing plates or cups with HIV infected people	1	2	8
		Other(Specify)_____	1	2	8
		Don't know	1	2	8

4.3	Can HIV or AIDS be caught by	YES	NO	DON'T KNOW
4.3.1	using condom every time when having sex	1	2	9
4.3.2	having vaginal sex without a condom	1	2	9
4.3.3	being bitten by mosquitoes	1	2	9
4.3.4	sharing a toilet with and HIV infected person	1	2	9
4.3.5	abstaining completely from sex	1	2	9
4.3.6	having anal sex	1	2	9
4.3.7	sharing a plate of food with an HIV infected person	1	2	9
4.3.8	having oral sex	1	2	9

Cross-sectional questionnaire-english-final version (22/09/2008)

Annex 8: Implementation of PMTCT and maternal syphilis screening in Mwanza city
Cross-sectional questionnaire-Maternity ward (Knowledge questions only)

4.3 (cont..d)	Can HIV or AIDS be caught by	YES	NO	DON'T KNOW
4.3.9	witchcraft	1	2	9
4.3.10	Shaking hands with an HIV person?	1	2	9
4.4.	Do you think that a person who looks healthy could be infected with HIV?	*(Circle one)*	Yes 1 No 2 Don't know 9	
4.5	Have you ever seen anyone who is infected by HIV? ***If 2=No go to section E***	*(Circle one)*	Yes 1 No 2	
4.6	Do you know anyone who has died of AIDS	*(Circle one)*	Yes 1 No 2 NA 8	
4.7	Have you ever cared an HIV patient?	*(Circle one)*	Yes 1 No 2 NA 8	

5	**Section E: Knowledge on MTCT of HIV & Syphilis & PMTCT of HIV & Syphilis**

"I am now going to ask you some questions about diseases that can be transmitted from the mother to the baby during pregnancy and after delivery and how they can be prevented"

5.1	Do you know of any infections that can be transmitted from the pregnant woman to her baby during pregnancy or after birth? ***Interviewer: if 2=No please explain the question in a simple language to confirm that she real don't know, if it is true that she doesn't know skip to q5.3***	*(Circle one)*	Yes 1 No 2

5.2	What infections do you know that can be transmitted from the mother to the unborn child?	*(Circle 1=mentioned for all that are mentioned*	*Mentioned*	*Not mentioned*
		HIV	1	2
		Syphilis	1	2
		Malaria	1	2
		Other (specify)_____	1	2
		Other (specify)_____	1	2
		Don't know	1	2

Annex 8: Implementation of PMTCT and maternal syphilis screening in Mwanza city
Cross-sectional questionnaire-Maternity ward (Knowledge questions only)

5.3	Can HIV positive woman transmit HIV to her baby? *If 2=No skip to q5.8*	*(Circle one)* Yes	1
		No	2
		Don't know	9
5.4	Can HIV positive woman transmit HIV to her baby before birth (in the womb)?	*(Circle one)* Yes	1
		No	2
		N/A	8
		Don't know	9
5.5	Can HIV positive woman transmit HIV to her baby during labour or delivery?	*(Circle one)* Yes	1
		No	2
		N/A	8
		Don't know	9
5.6	Can HIV positive woman transmit HIV to her baby during breastfeeding?	*(Circle one)* Yes	1
		No	2
		N/A	8
		Don't know	9

		(Circle 1=mentioned for all that are mentioned	*Mentioned*	*Not mentioned*	NA
5.7	Do you know how we can prevent an HIV infected mother to transmit HIV to her baby?	By giving drugs that act against HIV to the mother during pregnancy	1	2	8
		By giving drugs that act against HIV to the baby soon after birth	1	2	8
		Having a baby by caesarean section	1	2	8
		Not breastfeeding	1	2	8
		Exclusive breastfeeding	1	2	8
		Other (specify)_____	1	2	8

5.8	Can a woman infected with syphilis transmit syphilis to her baby? *If 2=No skip to section F*	*(Circle one)* Yes	1
		No	2
		Don't know	9
5.9	Can a woman infected with syphilis transmit the infection (syphilis) to her baby before birth (in the womb)?	*(Circle one)* Yes	1
		No	2
		N/A	8
		Don't know	9

Annex 8: Implementation of PMTCT and maternal syphilis screening in Mwanza city Cross-sectional questionnaire-Maternity ward (Knowledge questions only)

5.10	Can a woman infected with syphilis transmit the infection (syphilis) to her baby during labour or delivery? *(Circle one)*	Yes		1
		No		2
		N/A		8
		Don't know		9
5.11	Can a woman infected with syphilis transmit the infection (syphilis) to her baby during breastfeeding? *(Circle one)*	Yes		1
		No		2
		N/A		8
		Don't know		9
5.12	How can we prevent a mother with syphilis transmitting this to her baby? *(Circle 1=mentioned for all that are mentioned*	*Mentioned*	*Not mentioned*	NA
	By giving treatment to the mother during pregnancy	1	2	8
	By treating the baby soon after birth	1	2	8
	Having a baby by caesarean section	1	2	8
	Not breastfeeding	1	2	8
	Other (specify)_____	1	2	8