# ASSOCIATION BETWEEN PMTCT SERVICES UTILIZATION AMONG HIV POSITIVE MOTHERS AND HIV STATUS OF THEIR HIV-EXPOSED CHILDREN IN MTWARA DISTRICT, TANZANIA

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**Master of Public Health Dissertation**

**Muhimbili University of Health and Allied Sciences**

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**By**

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**A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Public Health of the Muhimbili University of Health and Allied Sciences**

**November, 2012**

## Certification

The undersigned certifies that he has read and hereby recommends for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled ***Association Between PMTCT Services Utilization Among HIV Positive Mothers and HIV Status of their HIV-Exposed Children in Mtwara District, Tanzania*** in partial fulfillment of the requirements for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences.

Signature:_____

Prof. K. S. Mnyika
(Supervisor)

Date:_____

## Declaration and Copyright

I, **Nassor Salim Mohammed**, declare that this **dissertation** is my own original work and that it has not been submitted to any University for a similar degree or any other degree award.

Signature_____ Date: _____

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## Dedication

This work is dedicated to my lovely wife **Bishara Mohamed Msallam** and our son **Nabil Nassor** who got along with my absence for one year and provides me with the encouragement and support I need.

## ABSTRACT

**Background:** Although without any intervention in PMTCT up to 80% of HIV exposed children could not be infected with HIV, PMTCT interventions provide a critical opportunity to prevent vertical transmission of HIV from mother to child during pregnancy, labour and delivery and/or during breastfeeding.

**Objectives:** The objective of the study therefore was to determine the association between utilization of PMTCT services among HIV positive mothers with children aged 6 to 24 months and HIV status of their exposed children attending post-natal clinics in Mtwara Rural District.

**Material and Methods:** The study was carried out between July and August 2012. Analytical cross sectional study using structured questionnaire among 130 HIV positive mothers who had children aged between 6 to 24 months was employed. Random sampling of Health Facilities were done followed by conveniently sampling to select participants, where all HIV positive mothers (who fulfilled the inclusion criteria) who attended the clinic during the time of data collection were consecutively included in the study till the sample size reached.

**Results:** About 10% of children born by mothers who knew their HIV positive status before pregnancy and they were on ARV treatment were infected with HIV compared to 50% of children born by mothers who were not on ART treatment before pregnancy ($\chi^2$ =4.3, p = 0.038). Transmission rate of HIV from mother to child among mothers who received ARV's for PMTCT during pregnancy was 15.5% compared to 58.8% of mothers who do not received ARV's for PMTCT during pregnancy. Regardless of intervention, the prevalence of HIV among exposed children who had mixed feeding was 36.1% while for those who were exclusively breastfed/formula fed was 13.8% ($\chi^2$ = 8.077, p = 0.004).

**Conclusions and Recommendations**: Reduction of MTCT of HIV is possible with effective PMTCT interventions, including access to ARV's for PMTCT by mothers during pregnancy, labour, and during lactation period and also for exposed children from birth till when they stopped breastfed or proven to be HIV infected. Appropriate infant feeding practices is also crucial in reduction of MTCT. Strategies to address programmatic challenges of lower ANC attendance, low facility delivery and low post-natal care attendance in rural Tanzania which contribute to low uptake of ARV prophylaxis for PMTCT during pregnancy, labour and after delivery observed in this study are essential.

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## List of Abbreviations

| | |
|---|---|
| **AIDS** | Acquired immune deficiency syndrome |
| **ANC** | Antenatal care |
| **ARV** | Antiretroviral |
| **AZT** | Azidothymidine, also known as zidovudine |
| **CDC** | US Centers for Disease Control and Prevention |
| **CPT** | Cotrimoxazole preventative therapy |
| **CTC** | Care and Treatment Clinic |
| **DED** | District Executive Director |
| **DMO** | District Medical Officer |
| **HIV** | Human immunodeficiency virus |
| **MOHSW** | Ministry of Health and Social Welfare |
| **MTCT** | Mother-to-child transmission of HIV |
| **NACP** | National AIDS Control Programme |
| **NVP** | Nevirapine |
| **PMTCT** | Prevention of Mother to Child Transmission of HIV |
| **STI** | Sexually Transmitted Infections |
| **TACAIDS** | Tanzania Commission for AIDS |
| **TBA** | Traditional Birth Attendants |
| **TDHS** | Tanzania Demographic and Health Survey |
| **UNAIDS** | United Nations Programme on HIV/AIDS |
| **UNDP** | United Nations Development Programme |
| **UNGASS** | United Nations General Assembly Special Session |
| **VCT** | Voluntary Counselling and Testing |

## Operational definitions of terms

For the purpose of this study, the following terms will be defined as follows:

**Complementary foods:** Any food, whether manufactured or locally prepared, that is added to a child's diet when the child reaches 6 months of age.

**Exclusive Breastfeeding:** 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.

**HIV Exposed Infants:** are those infants born by HIV infected mothers

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

**Replacement Feeding:** Feeding infant something OTHER THAN breast milk.

**Utilization:** The ratio between output (PMTCT service) and service capacity

**AVERT:** Is an international HIV and AIDS charity based in the UK, working to avert HIV and AIDS through education, treatment and care

# CHAPTER ONE
# INTRODUCTION

## 1.1 Background Information

Prevention of mother-to-child transmission (PMTCT) of HIV has been at the forefront of global HIV prevention activities since 1998, following the success of the short-course zidovudine and single-dose nevirapine clinical trials [(1).] These offered the promise of a relatively simple, low-cost intervention that could substantially reduce the risk of HIV transmission from mother to baby. Research and programme experience over the past ten years has demonstrated newer and more effective ways to prevent new paediatric infections, particularly in high-burden, low-resource settings.

An estimated 430 000 children were newly infected with HIV in 2008, over 90% of them through mother-to-child transmission (MTCT) and without treatment, about half of these infected children will die before their second birthday. Although without any intervention, the risk of MTCT ranges from 20% to 45% but specific interventions in non-breastfeeding populations, the risk of MTCT can be reduced to less than 2%, and to 5% or less in breastfeeding populations [(2).] To prevent the transmission of HIV from mother to baby, the World Health Organization promotes a comprehensive approach, which includes the following four components: Primary prevention of HIV infection among women of childbearing age; Preventing unintended pregnancies among women living with HIV; Preventing HIV transmission from a woman living with HIV to her infant; and Providing appropriate treatment, care and support to mothers living with HIV and their children and families.

In Tanzania PMTCT is the core component of the National Health Sector Strategy on HIV/AIDS that has two main strategic objectives: Firstly to reduce MTCT during pregnancy, delivery and breastfeeding, while also ensuring the entry of HIV-infected women and their families into care and treatment; and secondly to increase the percentage of HIV-infected women who receive antiretroviral prophylaxis from 32% in 2007 to 80% in 2012. [(3)]

In order to control the MTCT problem in 2000, the Ministry of Health and Social Welfare in collaboration with UNICEF established the five initial PMTCT pilot sites in four referral hospitals and one regional hospital located in five regions namely Kilimanjaro, Mwanza, Kagera, Mbeya and Dar es Salaam [(4)]. The aim of the pilot sites was to determine the feasibility of integrating PMTCT into routine reproductive and child health services in Tanzania. Since the pilot, PMTCT services have been adopted by the government of Tanzania as one of the most important interventions in fighting against HIV/AIDS in Tanzania. As of 2009, 3,626 facilities out of 4,047 (78.6 percent) that provide ANC also provide at least some PMTCT services.

Tanzania has achieved commendable efforts in scaling up PMTCT activities in collaboration with many non-profit organizations like EGPAF and UNICEF although, the PMTCT and Pediatric HIV Care Programme is still confronting many challenges. These challenges include**,** low population-based coverage of PMTCT services, low infant ARV prophylaxis, limited access of pregnant women and children to a comprehensive package of reproductive health and HIV prevention care and treatment services, inadequate staffing (number and skills) in the health facilities. In spite of efforts to prevent the spread of HIV/AIDS from mother-to-child, existing data in Tanzania reveal that achievement of PMTCT is very little, less than 10 percent of pregnant women infected with HIV/AIDS receive PMTCT services.

It is further noted that even in areas where effective prophylaxis is available to prevent transmission of mother to child, few PMTCT programme successfully reach mothers and newborns after discharge to provide support for the infant feeding choices or to provide ongoing care and treatment.

Various studies have been conducted and reveal the existence barriers towards utilization of PMTCT services but little has been known on the association of utilization of PMTCT services among HIV-positive mothers and HIV test results of HIV-exposed children.

## 1.2 Statement of the problem

Children are mainly infected with HIV through mother to child transmission (MTCT) at the time of pregnancy, labour and delivery or through breastfeeding. Besides the dominant heterosexual transmission of HIV, vertical transmission from mother to child accounts for 90% of pediatric AIDS. Particularly in developing countries, MTCT has become a critical child health problem [(2)].

Although it is known that effective PMTCT programme using Antiretroviral therapy (ART) and replacement feeding reduce the risk of HIV transmission from mother to child to below two percent[(5)]. The implementation of PMTCT programme faced a number of barriers [(6)]. Due to these barriers, in 2008, it was estimated that only 45% of HIV-positive pregnant women in the sub-Saharan Africa had access to prevention of mother to child treatment (PMTCT) programme [(2)]. It is further noted that even in areas where effective prophylaxis is available to prevent transmission of mother to child, few PMTCT programme successfully reach mothers and newborns after discharge to provide support for the infant feeding choices or to provide ongoing care and treatment. As the result about 430 000 children globally were newly infected with HIV in 2008, 90% through MTCT and nearly 90% of MTCT of HIV occurred in Sub-Saharan Africa. Without appropriate treatment out of these infected children approximately half will die before their second birth day[(2)]

A review of the literature cites limited human resources as one of the major factors impacting successful PMTCT implementation [(7)]. Psychosocial barriers like fear of disclosure and discrimination and cultural norms and practices related to breastfeeding and childbirth have been identified as important barriers to PMTCT implementation [(8, 9, 10, 11)].

The influence of male involvement on successful PMTCT is also a topic that has been identified in the literature as an important barrier to PMTCT implementation [(11, 12, 13,)].

Despite this extensive research and knowledge on the barriers to utilization of PMTCT services little has been know on the association of utilization of PMTCT services among HIV-positive mothers and HIV test results of HIV-exposed children. The study by WHO shows that, without any intervention still 55-80% of HIV exposed children could not be

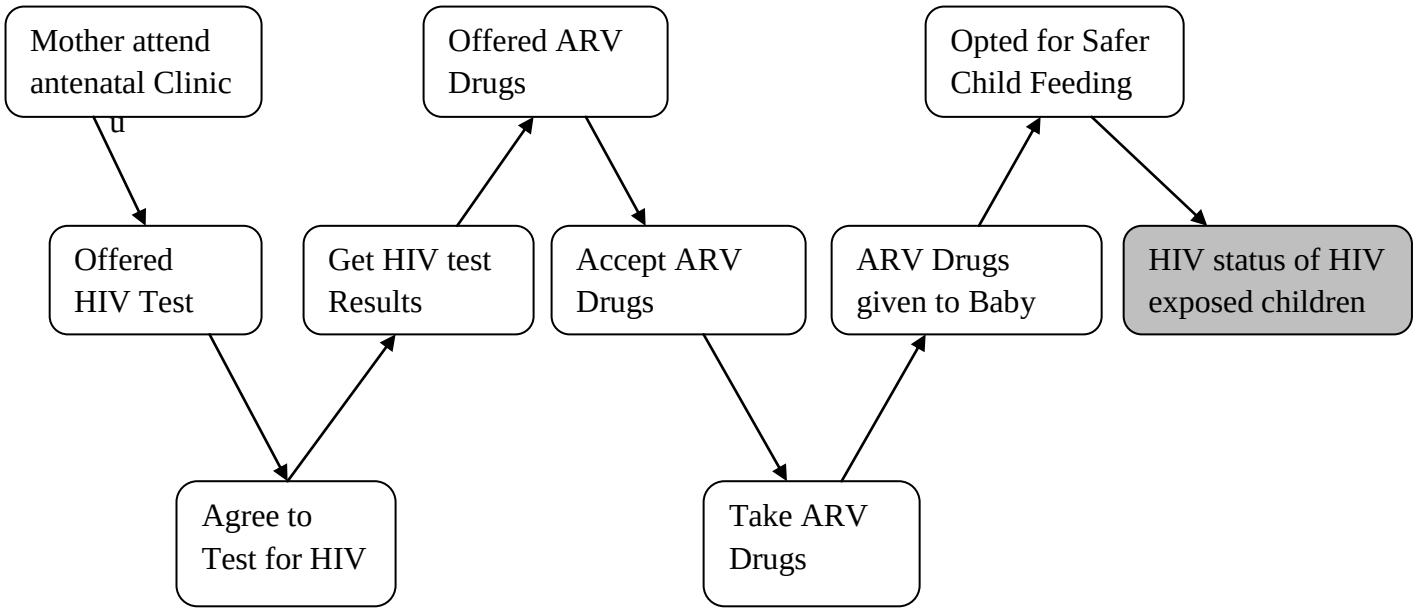
infected with HIV [2]. Therefore the purpose of this study was to determine the association of PMTCT services utilization among positive mothers and their HIV exposed children and HIV test results among HIV-exposed children.

**The Conceptual Frame work for Effective PMTCT services**

The following is a conceptual model (Figure 1) showing how the successful PMTCT services operate. The most important coverage measure is effective coverage and it is the percentage of population in need of intervention and has received it.[14] It is a cumulative effect of all steps in this model and the whole process of efficiency of PMTCT services is illustrated as explained below from ANC attendance to safer feeding for infants.

Different studies further explain that improving efficiency means looking at the resources, testing methods for HIV, fear and distrust experienced by pregnant women, fear of disclosure and discrimination, provided drug effectiveness, treatment for mothers and feasibility of replacement feeding.

**Fig. 1.** Conceptual framework for effective PMTCT service




**Source: AVERT**

### 1.3 Rationale of the study

Vertical transmission from mother to child accounts for 90% of pediatric AIDS particularly in developing countries, MTCT has become a critical child health problem [(2)]. In spite of the efforts to prevent the spread of HIV/AIDS from mother-to-child, existing data in Tanzania reveal that achievement of PMTCT is very little, less than 10 percent of pregnant women in Tanzania infected with HIV/AIDS receive PMTCT services. It is further noted that even in areas where effective prophylaxis is available to prevent transmission of mother to child, few PMTCT programme successfully reach mothers and newborns after discharge to provide support for the infant feeding choices or to provide ongoing care and treatment [(15)].

This makes the need of this study which aims at finding the association of utilization of PMTCT services among HIV-positive mothers and HIV test results of HIV-exposed children, taking into consideration that not all HIV positive pregnant women/mothers and their infants are reached by PMTCT interventions in the programme area. Most of the study shows that there are many challenges or barriers in implementing PMTCT programme. However little has been known on the impact of those barriers to the HIV test results of exposed infants. The results for this study will help the PMTCT programme implementers to know the contribution of the PMTCT programme to achieve the desired outcome of preventing HIV infections from mother to child, during pregnancy, labour and delivery and during breast feeding.

Knowing this association is important due to the fact that, without any intervention in PMTCT still 55-80% of children would have not been infected with HIV through mother to child transmission[(2)]. This means that PMTCT programme can claim of preventing exposed infants from HIV infections while the results are not associated with PMTCT services.

## 1.4 Research question

1. What is the prevalence of HIV among HIV exposed children?
2. What is the association between utilization of PMTCT services among HIV positive mothers and HIV status of HIV exposed children?
3. What type of PMTCT services are utilized by HIV positive pregnant women during pregnancy?
4. What type of PMTCT services are utilized by HIV pregnant women during labour and delivery?
5. What type of PMTCT services are utilized by HIV positive mothers and their exposed children after delivery?

## 1.5 Study hypothesis

There is no difference in HIV status among exposed children whose mothers utilizes the PMTCT services and those whose, their mothers did not utilize the PMTCT services.

## 1.6 Objectives

### 1.6.1 Broad Objective

To determine the association between utilization of PMTCT services among HIV-positive mothers and HIV status of their exposed children attending post-natal clinic in Mtwara District

### 1.6.2 Specific Objectives

1. To determine the prevalence of HIV among HIV exposed children aged 6 to 24 months attending post-natal clinic in Mtwara District.
2. To determine the level of utilization of PMTCT services among HIV positive mothers during ANC visit and its association on HIV status of their exposed children.
3. To determine the level of utilization of PMTCT services among HIV positive mothers during labour and its association on HIV status of their exposed children.
4. To determine the level of utilization of PMTCT services among HIV positive mothers after delivery and its association on HIV status of their exposed children.
5. To determine the level of utilization of PMTCT services among HIV exposed children aged 6 to 24 months and its association on their HIV status.

# CHAPTER TWO
# LITERATURE REVIEW

## 2.1 Introduction

The review of related literature brings clarity and focus to the research problem as well as improving the methodology and broadening the knowledge base on the subject. The study focused on the association between PMTCT service utilization among HIV positive mothers and HIV status of their HIV exposed children within a theoretical framework of effective PMTCT services. The most important measure in the model is effective coverage and it is a cumulative effect of all steps in this model and the whole process of efficiency of PMTCT services from ANC attendance to safer feeding for infants.

## 2.2 Pediatric HIV/AIDS Situations Worldwide

Human immunodeficiency virus (HIV) is the retrovirus that causes acquired immune deficiency syndrome (AIDS). In 2006, of the approximately 40 million people living with HIV worldwide, 63% resided in lower income countries in sub-Saharan Africa [(16)]. In these lower income countries over half of the population lives in rural areas, suggesting a need to examine HIV care and prevention within the context of rural, resource poor settings, rather than oft-thought urban priority areas[(17)]. In Tanzania, for example, the UNAIDS 2006 AIDS Epidemic Update states that HIV infections in rural areas of the country, where three-quarters of the population live, could double that of urban populations by 2010. The burden of HIV in rural areas will only continue to grow and must be addressed.

In sub-Saharan Africa, women bear a disproportionate burden of HIV infection, as compared to men. Young women (15–24 years) are four times more likely to be infected with HIV than young men [(16)]. Gender and limited resources can intensify outcomes of HIV; specifically, HIV negatively impacts a women's quality of life, her family, and her community [(18)]. Not only are women more likely to be infected with HIV, but they are also more likely to be the ones caring for people infected with HIV, as a family member or health provider [(6, 16)].

### 2.3 Mother to Child Transmission of HIV

The affect of HIV infection on women's reproductive health is also of great importance, specifically, childbearing. An HIV-positive mother risks transmitting HIV to her child during pregnancy, labour and delivery and/or breastfeeding. In the absence of any intervention mother-to-child transmission of HIV occurs in about one third of children of HIV-positive mothers, occurring 5%-10% during pregnancy itself, 10%-20% in labour, or 5%-20% during breastfeeding [6, 19]. Every year more than 600,000 children worldwide are newly infected with HIV, almost always (90%) by way of mother-to-child transmission (MTCT) of HIV and almost entirely in the developing world [20, 21].

A woman infected with HIV can pass the virus to her baby during pregnancy, labour and delivery or breastfeeding. Without preventive intervention, roughly 15 to 30% of newborns of untreated HIV-positive women will become infected with HIV during pregnancy and delivery and an additional 10 to 20% during breastfeeding. The risk has varied by region—with rates of 15-to 25% transmissions in industrialized countries of Western Europe and the U.S., but higher rates (25 to 35%) reported from developing countries. Some studies have found rates as high as 43% in Sub-Saharan Africa [22]. Variations could be due to differences in epidemiology of STIs, availability of safe obstetric practices, utilization of ARV drugs.

### 2.4 Prevention of Mother to Child Transmission of HIV Interventions

Recently, interventions to prevent transmission of HIV from mother to child have become increasingly available in Africa. There are three main strategies that are essential for achieving maximum effective reduction of MTCT of HIV: primary prevention of HIV among "would be parents", prevention of unwanted pregnancy among HIV positives, prevention of HIV transmission from HIV infected females to their infants [through antiretroviral therapy to pregnant females (reduce maternal viral load with ARV drugs) and infants, prevention of avoidable exposure to maternal virus at birth through improved obstetric practices (strict application of infection prevention(IP) precautions, and where applicable, caesarian section) and reduction of exposure to HIV through breast feeding or replacement feeding for the infant] [22, 23].

Testing during antenatal period offers several advantages including early counseling on the prevention of MTCT and on maintaining health; to take steps to prevent exposing partners; plan for treatment and follow-up for the baby; receive support to maintain her health, including proper nutrition, treatment of sexually transmitted infections (STIs), and care for other infections, such as tuberculosis (TB) or malaria. If a woman is negative, she and her partner can be counseled on risk reduction. This may be particularly important in areas where taboos on sexual activity during pregnancy or postpartum might cause a man to seek other partners, thereby placing a woman at risk when she resumes sexual activity with her partner [22, 24].

The most effective way to prevent MTCT is to prevent the woman from becoming infected in the first place, and to provide access to family planning to HIV-positive women who want to prevent pregnancy. It includes HIV education, safe-sex practices, avoidance of sharing contaminated needles, early treatment of sexually transmitted diseases (STDs) and change in moral behavior and attitude of the community. In the developing countries, most of the mothers are getting infection from their husbands through sexual route; i.e. fathers are equally responsible for the transmission of HIV to their children. Hence, in order to ensure that mothers alone should not be blamed for MTCT, PMTCT has been renamed as PPTCT (prevention of parent to child transmission) in India [22, 25].

Researchers in some parts of sub Saharan Africa conducted various studies on PMTCT of HIV to determine coverage, to see problems and challenges and find out solutions for programmatic effectiveness. In Coast Provincial General Hospital (CPGH), Mombasa, Kenya, Marleen Temmerman et.al made a hospital based observational study over one year period among 3564 pregnant women with first-ANC visit to review coverage of the nevirapine in the existing PMTCT model. They found a counseling rate of 71% and a testing rate of as high as 97% [26].

**2.5 Utilization of PMTCT services**

In Kampala Uganda, Marina Giuliano et.al made evaluation of a five-year performance of a Hospital PMTCT programme in 2003-2004 to identify potential reasons affecting its uptake [27]. They found a 76.0 % testing rate and a 79.9% acceptance of test result. In

Zimbabwe, Freddy Perez *et.al* estimated PMTCT programme uptake using routine monitoring data collected over 2½ years period [28]. It was found that 92.9% were counseled and 74.3% received posttest counseling, while only 24% received complete mother–child antiretroviral prophylaxis. Similarly, in a one year cohort of 3136 ANC attendee in Malawi 96% were pre-test counseled and 95% underwent HIV testing as well as post-test counseling [29].

**2.6 Barriers to utilization of PMTCT services**

Thomas M Painter et.al in Abidjan, Ivory Coast, made a clinic based qualitative interview of 27 HIV positive pregnant women over 8 months time [30]. In that study, negative experiences that pregnant women had while interacting with programme staff or to their views about the programme was an important barrier for returning back. Some women are dissatisfied with how HIV testing had been explained-horrible consequences of the disease emphasized. On the other hand, Nuwagaba-Biribonwoha H. et.al pointed out that among the challenges with the PMTCT programme are staff shortages, overworked and under-motivated staff [31]. In Kigali, Rwanda a 13 months prospective cohort study of factors associated with failure to return for HIV post-test counseling in pregnant women revealed that the only variable significantly associated with failure to return for post-test counseling was a positive HIV test result[32]. In a cross sectional study conducted among pregnant women following ANC in Tanzania on attitudes to voluntary counseling and testing, the major concern of women was for the reaction of their male partners to the possibility of a positive HIV test and low confidence in the confidentiality of HIV testing [33]. Other team of investigators has also identified that enrolment in to PMTCT programme were lower in married or cohabitating women than single women [34].

Many women do not participate in PMTCT programmes. Missed opportunities to offer, or low uptake of voluntary counseling and testing (VCT) during routine ANC; refusal to be tested for HIV both by pregnant women and partners; inadequate acceptance of ART offered to HIV+ women at ANC; poor adherence to "take-home" antiretroviral drugs (ARV) for mother and newborn when given to HIV+ women at ANC; insufficient use of facility-based delivery where improved obstetric practices can be used and antiretroviral

therapy (ART) for mother and newborn can be supervised; low coverage of newborns with ART even when delivered in facility; and non-receipt of HIV test results have been studied as barriers to participation. The reason why less than one third of pregnant women who receive HIV positive test results eventually start taking antiretroviral prophylaxis is not examined well[34, 35]. A study in Burkina Faso revealed that up to as much as 53% of pregnant women declared not to know the existence of MTCT risk, reminding the existence of wide knowledge gap [36]. In a community-based survey on knowledge and attitude towards VCT in northwest Ethiopia on 992 residents, it was indicated that most of the interviewed individuals were lacking the correct knowledge on mode of transmission and prevention measures [37].

While VCT campaigns continue to focus on the benefits of testing before conception, 'Planning to have children' was among the least expressed reasons for accessing VCT services [24]. Despite prior knowledge of HIV seropositivity 36% of women in a Jamaican study had circumstances of repeat pregnancies and poor partner notification [38]. Denial of HIV positive test results is not uncommon among women and even some do not believe that ARV prophylaxis is effective in preventing MTCT of HIV [30]. Reasons for refusing include concerns over privacy and confidentiality, stigma attached to the HIV test and "fear" of a positive result [36]. Fear of stigma and discrimination against people living with HIV/AIDS discourages some women from taking precautionary measures that can greatly reduce the risk of MTCT, such as to find out their HIV/AIDS status, seeking counseling if they are HIV-positive and pregnant, taking ARVs while pregnant; or choosing not to breast feed [23, 39].

### 2.7 Cultural norms inhibit successful PMTCT implementation

Cultural norms that inhibit successful PMTCT implementation include prolonged breastfeeding and delivery in traditional birth settings. Abrupt weaning or formula feeding is a frequent component of PMTCT programmes to reduce the transmission to the child after birth. However, a women who is not breastfeeding her child in many settings in sub-Saharan Africa may inadvertently disclose her HIV status [22, 25]. In sub-Saharan Africa, only 46% of women give birth in a health facility with a nurse-midwife or doctor, the

remaining give birth at home with traditional birth attendants (TBA) (22%), relatives (26%), or no attendant at all (6%) [25].

Acceptance of HIV test and enrolment in the PMTCT programme were lower in married or cohabitating women than single women, in women belonging to the minorities/marginalized segments, and in lower educational status. At times the only variable significantly associated with failure to return for post-test counseling can turn out to be a positive HIV test result. These indicates that the fear of being identified as HIV positive in the family, fear of being recognized by service providers and lack of awareness are still strong limiting factors. The major concern of women in VCT is for the reaction of their male partners to the possibility of a positive HIV test and low trust in the confidentiality of HIV testing. Particularly the role of husbands in the success of PMTCT programmes is pointed out to be critical, since partner participation in VCT and couple counseling increase uptake of nevirapine and formula feeding by many folds.[28, 30, 31, 32, 40]

Male involvement affects many aspects of a mother's ability to travel, get tested, and attend an antenatal clinic. Related to inadequate community and male partner engagement, a mother's ability to disclose her HIV status and participate in a PMTCT programmes is greatly limited [13, 15, 30]. Researchers in Uganda and other settings identify the strongest predictor of a women's acceptance to test was approval of her husband [4, 11, 12]. While others report: "When male partners are included in counseling and testing, there is increased uptake of all PMTCT interventions; women are more likely to undergo testing, return for results, take antiretroviral drugs, avoid breastfeeding, and use condoms. But cultural beliefs about male participation in pregnancy, along with daytime clinic hours and women-only clientele of the clinics make many men uncomfortable and discourage their attendance" [6].

**2.8 Continuity of PMTCT services**

Low health service utilization and lose to follow up common among African pregnant women further complicates the problem. In Ethiopia, heavy workload, lack of access to health services, poverty, traditional practices, poor social status and decision-making

power, and lack of access to education are among the highly prevalent socio-cultural factors that potentially affect the health of women [40].

In a Kenyan study, only 29% of HIV-infected women who received posttest counseling at 23rd –24th weeks of gestation collected nevirapine at 34th week, and only 20% of infected women eventually took the drug in labour, partly due to the time lag between testing and providing the drug. In other part of Africa similar low uptake was reported in 2004. Only 30% of the pregnant women who attended antenatal care in the facility with PMTCT services delivered in that facility. The vast majority delivered at home or in another health facility [41, 42, 43].

It would have been possible to avert all infant HIV infections by reaching majority of pregnant women through PMTCT services [5]. Long course of Antiretroviral Therapy (ART) and replacement feeding reduce the risk to below two percent. In the past 5 years, in Western, Eastern and Central Europe, MTCT rates were reduced to as low as 1.6% through combined efforts. By using nevirapine alone MTCT of HIV can be reduced by 50% [26]. However without any interventions in PMTCT still 55-80% of children would have not been infected with HIV through mother to child transmission [2]. This means that not all exposed infants who are HIV negative is a results of PMTCT interventions. Most of the studies which have been done acknowledge the existence of barriers in implementation of PMTCT programme. However there is little knowledge on the association of HIV test results among HIV-exposed infants and PMTCT services utilization particularly in developing countries where less than 10% of HIV positive pregnant women access PMTCT services. Since without any intervention there is a chance that exposed infants could not be infected, therefore neither all HIV negative result among exposed infants are associated with PMTCT intervention nor all HIV positive result among exposed infants are due to lack of PMTCT services. This study will look at the association of HIV test results among HIV-exposed children and utilization of PMTCT services among HIV- positive mothers and their children in Mtwara District.

# CHAPTER THREE
# METHODOLOGY

## 3.1 Study Area

The focus of the study was Mtwara District in Mtwara region in Tanzania. The area was purposively chosen out of convenience. The District is one of the five District forming Mtwara Region. The District lies between longitudes 39 $^{o}$ 0" and 40$^{o}$ 27" east of Greenwich. It is also situated between latitudes 10$^{o}$ 0" and 10 $^{o}$ 07" south of the Equator. It is bordered by the Indian Ocean to the East, Lindi region to the North and Tandahimba to the west. It covers 3,597 square kilometers. It constitutes grasslands with poor soil. Basing on the 2002 census data, Mtwara District had a population of 204,770 people of whom 107,901 were females and 96,869 males [(44)]. In 2010 the district was estimated to have 228,860 people with a growth rate of 1.4. The dominant ethnic group in the district is the Makonde. Administratively the council is divided into 6 divisions, 28 wards, 157 villages and 638 hamlets. The District has a total of 38 health facilities, 4 are health centers and 34 are Dispensaries. All 38 Health facilities in the District providing basic PMTCT services although, the services are not universally accessible due to the fact that the health facilities are not equal distributed in the District.

## 3.2 Study population

The study populations were HIV positive mothers of HIV exposed children aged 6 to 24 months with known HIV status who attend postnatal clinics in Mtwara District who were estimated to be 370 mothers. To be sure about HIV status of exposed children, patients' records were carefully scrutinized by the principle investigator before being recruited. PMTCT clinic staffs (nurses and clinicians) who have worked in the PMTCT programme for a minimum of one year were also targeted as key informants in order to get outsiders' information.

## 3.3 Study type

This study was analytical cross-sectional study in which quantitative method in data collection were employed. This design was chosen to meet the main objective of the study

which was to determine the association between utilization of PMTCT services among HIV- positive mothers and HIV status of their HIV exposed children.

### 3.4 Sample size and sampling strategy

The list of health facilities which has at least 5 potential respondents was obtained from the DMO's office. Simple random sampling technique using table of random numbers was applied to select 11 health facilities that were included in the study. Then convenient sampling was used to select participants, where all HIV positive mothers (who fulfill the inclusion criteria) who attend the clinic during the time of data collection was consecutively be included in the study till the sample size reached.

The sample size was calculated using the following formula:

$$n = \frac{z^2 p\,(100-p)}{\varepsilon^2}$$

Where:

n = expected minimum sample size

z= corresponds to 1.96 (at 95% CI)

ε=margin of error (8%)

p = the prevalence of HIV among exposed infants (26.5%)

Sample size (n) = 117

To adjust for non response, a non response factor of 1/(1-L), where L = non response (10%) was used.

Therefore, **sample size (n) = 130**

### 3.5 Data collection techniques and tools

Data collection was done using structured questionnaire with closed ended questions. The questionnaire was prepared originally in English and translated to Swahili. A different person made retranslation back to English for checking consistencies. The Swahili version was used for the actual interview and administered to the respondents by the research assistants who were recruited (from among the health workers who were on annual leave) and trained by the Principal Investigator on how to administer the questionnaire so as to obtain the intended results. Two (2) research assistants were recruited and the recruitment considering those who have good communication skills and experience in the area of PMTCT services. To avoid bias the research assistants were allocated to work away from their working station and they were closely supervised by Principal Investigators to ensure the procedures are strictly followed. The HIV positive mothers were identified prior data collection through review of patient records. Data were collected from 16$^{th}$ to 27$^{th}$ of July, 2012.

### 3.6 Pre-test

Pre-testing of the study was done in order to test the clarity of questions and study logistics. It was also done to help research assistants to exercise flexibility in the wording of questions and probing. For this study, pre-testing was conducted in Mtwara Regional Hospital-Ligula among participants equivalent to 5% of the sample size by the trained interviewers. The questionnaire was found to be perfect except for minor typographical errors which were corrected ahead of data collection.

### 3.7 Variables

In this study, dependent variable or outcome of interest was the status of HIV among HIV exposed children while independent variables include utilization of PMTCT services during Antenatal clinics, Labour and Delivery, after delivery and adherence to safe feeding option.

### 3.8 Plan for data processing and analysis

The whole process of data collection and questionnaire filling was supervised by the Principal Investigator to ensure quality control. Data collected on daily basis by research

assistants was submitted to Principle Investigator for data cleaning, coding and entering data into data base using SPSS software version 17. Cross tabulation were made to calculate crude odds ratios, p-values and $\chi^2$ for descriptive (uni- and bi-variate) analysis. Following this multi-variate analysis using the logistic regression model was done to test for association between dependent variable and independent variables with a significance level of 0.05.

### 3.9 Ethical considerations

Research ethics focuses on a number of concerns including ensuring the welfare of those who participates in the research, keeping honesty in conducting research and treating information given by participants with maximum anonymity and confidentiality. During the time of data collection, HIV positive mothers were identified by service provider in the respective health facilities and he/she was the one who initiate the discussion and ask the respondents if she agreed to participate or not and then refer her to the research assistant for interview.

In the process of adhering with ethical standards, ethical clearance was sought and obtained from MUHAS prior to the study. Research permit was also sought and obtained from the Mtwara District Executive Director (DED). Furthermore, informed consent was sought and obtained from participants prior to their participation in the study. Specifically, participants were informed about the objectives of the study and that their participation was voluntary and none cohesive.

In addition, participants were free to decline or withdraw during or in the course of the study without any repercussion. It was clearly clarified that the information provided whether orally or in writing was for research purposes and would therefore be strictly anonymous and dealt with confidentially. In addition, participants were assured that declining to participate would not affect the care they receiving at the respective health facilities. No respondents declined.

### 3.10 Limitation of the study

The limitation of this study was that, study population included only mothers whose HIV status of their children is known and left out HIV positive mothers whose HIV status of their children is unknown. If mothers whose HIV status of their children were not known their children tested for HIV and involved in this study the result could be different. Additionally, some findings have limited statistical significance due to a limited sample size which was contributed by insufficient resources.

# CHAPTER FOUR

# RESULTS

## 4.1 Description of the study sample

A total of 130 HIV positive women who had HIV exposed children aged 6 to 24 months and who knows the HIV status of their children and they already stopped breastfeeding were included in this study. Mothers who were still breastfed were not included because Mother to Child Transmission of HIV could occur at this stage. All 130 mothers selected to be included in this study were positively respond, and thus the response rate was 100%. The age of women include in this study range between 20 and 44 years with mean age (±SD) of 32.7 (±6.04) and the median 24 years. The majority 88(67.7%) were living with their partners while 42(32.3%) were single, divorced or widowed. More than half of the respondents 73(56.2%) had never had formal education at any time prior to interview. About 82% of the respondents were farmers, 14 (10.8%) were housewife and the remaining 9 (6.9%) were businesswomen. The parity of the mothers ranged from 1 to 7 children with median of 3 children. The detailed distribution of the study participants by socio-demographic factors is shown in table 1.

**Table 1: Socio-demographic characteristics of the respondents**

| Socio-demographic factor | Categories | Total (n=130) | Percent |
|---|---|---|---|
| Age of mothers | 15-24 | 6 | 4.6 |
| | 25-34 | 75 | 57.7 |
| | 35-44 | 49 | 37.7 |
| Age of children | 7-12 | 55 | 42.3 |
| | 13-18 | 25 | 19.2 |
| | 19-24 | 50 | 38.5 |
| Marital status | Married | 88 | 67.7 |
| | Not married | 42 | 32.3 |
| Education level | No formal education | 73 | 56.2 |
| | Primary education | 54 | 41.5 |
| | Secondary education | 3 | 2.3 |
| Occupation of mothers | Peasant | 107 | 82.3 |
| | Others | 23 | 17.7 |
| Parity | 1 | 8 | 6.2 |
| | 2-4 | 88 | 67.6 |
| | ≥5 | 34 | 26.2 |

### 4.2 Socio-demographic characteristics of mothers and HIV status of their children

Table 2 shows the HIV status of the exposed children based on the socio-demographic characteristics of their mothers. The results show that 104 (80%) of mothers their children were not infected and the remaining 24 (20%) their children were infected with HIV. The differences observed on HIV status of the exposed children was based on socio-demographic characteristics; age of mother, age of children, marital status of mother, education level of mother and occupational of mother. However the differences were not statistically significant.

**Table 2: Socio-demographic characteristics of HIV positive mothers and HIV status of their HIV exposed children**

| Socio-demographic factor | Categories | HIV status of children | | Total (n=130) | p-value |
|---|---|---|---|---|---|
| | | HIV- n(%) | HIV+ n(%) | | |
| Age of mothers (Years) | 15-24 | 4(66.7) | 2(33.3) | 6 | |
| | 25-34 | 58(77.3) | 17(22.7) | 75 | |
| | 35-44 | 42(85.7) | 7(21.8) | 49 | 0.37 |
| Age of children (months) | 7-12 | 43(78.2) | 12(21.8) | 55 | |
| | 13-18 | 24(96) | 1(4.0) | 25 | 0.07 |
| | 19-24 | 37(74) | 13(26) | 50 | |
| Marital status | Married | 71(80.7) | 17(19.3) | 88 | |
| | Not married | 33(78.6) | 9(21.4) | 42 | 0.78 |
| Education level | No formal education | 57(78.1) | 16(21.9) | 73 | |
| | With formal education | 47(82.5) | 10(17.5) | 57 | 0.54 |
| Occupation of mothers | Peasant | 86(80.4) | 21(19.6) | 107 | |
| | Others | 18(78.3) | 5(21.7) | 23 | 0.82 |
| Parity | 2 children | 25(86.2) | 4(13.8) | 29 | |
| | ≥3 children | 79(78.2) | 22(21.8) | 101 | 0.34 |

### 4.3 Utilization of PMTCT services during ANC and HIV status of exposed children

All 130 respondents reported to have at least one ANC visit. Most of them 80 (61.5%) attended at the gestation age of 4 to 6 month, 44 (33.8%) at the gestation age of 1 to 3 month and only 6 (4.6%) at the gestation age of more than six month. Thirty three (25.4%) of respondents reported to know their HIV positive status before pregnancy and 29 (87.9%) of them were on ART treatment. Others 87(66.9%) knew their HIV positive status during pregnancy and 10 (6.9%) after delivery. About 89% of those who were on ART treatment before pregnancy their children were not infected with HIV compared to 50% of those who were not on ART treatment, the differences were statistically significant (p=0.041 ) (Table 3). Logistic regression analysis was done to determine the association between ARV treatment among mothers and HIV status of HIV exposed children. Although the result shows that, HIV positive mothers who were on ART treatment are 8.7 time more likely to have HIV negative children compared to HIV positive mothers who were not on ART treatment, the difference is not statistically significant ( OR = 8.67, 95% CI= 0.873, 86.06)

**Table 3: Reported mothers who were on ART treatment and HIV status of HIV exposed children**

| | | **HIV status of HIV exposed Children** | | **P – value** |
|---|---|---|---|---|
| | | HIV- | HIV+ | |
| | | n(%) | n(%) | |
| Mothers on ART treatment | YES | 26(89.7) | 3(10.3) | 0.041 |
| | NO | 2(50) | 2(50) | |

* 3 cells (75%) have expected count less than 5. P-value was calculated using Fisher's Exact Test.

About 83% of mothers who reported to know their HIV positive status during pregnancy were on ART prophylaxis. The results on table 4 show that, 84.5% of mothers who took ART prophylaxis during ANC their exposed children were not infected with HIV compared to 41.2% of mothers who did not took ART prophylaxis during ANC ($\chi^2 = 14.9$, $p < 0.001$). Logistic regression analysis was done to find the association. The result shows that mothers who were on ART prophylaxis for PMTCT during pregnancy were 18.2 times more likely to have HIV negative children compared to mothers who were not on ART prophylaxis for PMTCT during pregnancy. (OR= 7.8, CI= 2.514, 24.213)

**Table 4: Reported taking ART Prophylaxis during pregnancy and HIV status of HIV exposed children (N=101)**

| | | HIV status of HIV exposed Children | | $\chi^2$ | P – value |
|---|---|---|---|---|---|
| | | HIV+ n(%) | HIV- n(%) | | |
| ART prophylaxis during ANC | Yes | 13(15.5) | 71(84.5) | 14.9 | 0.001 |
| | No | 10(58.8) | 7(41.2) | | |

The results also show that there was association between the duration of taking ART and the HIV status of the exposed children. Table 5 shows that about 93% of mothers who took ART prophylaxis for more than 2 months during pregnancy their children were not infected with HIV while 62.5% of mothers who took ART prophylaxis for less than 2

months during pregnancy their children were not infected with HIV. (p = 0.001). Logistic regression analysis was done to find the association. The result shows that mothers who took ART prophylaxis for more than 2 months during pregnancy were 9 times more likely to have HIV negative children compared to mothers who took ART for less than 2 months during pregnancy. (OR = 8.4, 95% CI= 2.27, 31.082)

**Table 5: Reported time of taking ART Prophylaxis during pregnancy and HIV status of HIV exposed children (N=84)**

| | | **HIV status of HIV exposed Children** | | **P - value** |
|---|---|---|---|---|
| | | HIV+ n(%) | HIV- n(%) | |
| Time of taking ART prophylaxis | Less than 2 months | 4(6.7) | 56(93.3) | 0.001 |
| | More than 2 months | 9(37.5) | 15(62.5) | |

* 1cells (25%) have expected count less than 5. P-value was calculated using Fisher's Exact Test.

### 4.4 Utilization of PMTCT services during Labour and Delivery and HIV status of exposed children

A total of 116 out of 130 women interviewed (89.2%) delivered at health facilities. Among mothers who delivered at health facilities, 80.2% of their children were not infected with HIV compared to 78.6% of mothers who delivered at home (Table 6). The association between place of delivery and HIV status of HIV exposed children was not statistically significant (p = 0.88).

**Table 6: Place of delivery and HIV status of HIV exposed children (N=130)**

| | | HIV status of HIV exposed Children | | P - value |
|---|---|---|---|---|
| | | HIV+ n(%) | HIV- n(%) | |
| Place of Delivery | Home | 3(21.4) | 11(78.6) | 0.888 |
| | Health facility | 23(19.8) | 93(80.2) | |

* 1cells (25%) have expected count less than 5. P-value was calculated using Fisher's Exact Test.

Among mothers interviewed only 37 (28.5%) took ART during labour, many of mothers 78(83.9%) who do not take ART during labour their exposed children was HIV negative compared to 26 (70.3%) of mothers who take ART during labour and delivery, however the differences was not statistically significant ($\chi^2 = 3.06$, $p = 0.08$) (table 7).

**Table 7: Taking ART prophylaxis during labour and HIV status of HIV exposed children (N=130)**

| | | HIV status of HIV exposed Children | | $\chi^2$ | P – value |
|---|---|---|---|---|---|
| | | HIV+ n(%) | HIV- n(%) | | |
| ART during labour and delivery | Yes | 11(29.7) | 26(70.3) | 3.06 | 0.08 |
| | No | 15(16.1) | 78(83.9) | | |

**4.5 Utilization of PMTCT services after Delivery and HIV status of exposed children**

**4.5.1 Mothers using ARV prophylaxis and treatment after delivery and HIV status of HIV exposed children.**

A total of 113(86.9%) of all respondents were either on ART treatment or ART prophylaxis during pregnancy however only 63.7% of them continued with ARV after delivery. Many mothers 81.0% of those who did not continued with ARV after delivery their children were HIV negative compared to 79.2% of those who continue with ARV, however the differences was not statistically different ($\chi^2 = 0.070$, $p = 0.79$). (Table 8)

**Table 8: Continued with ARV after delivery and HIV status of HIV exposed children (N=130)**

| | | HIV status of HIV exposed Children | | $\chi^2$ | P - value |
|---|---|---|---|---|---|
| | | HIV+ n(%) | HIV- n(%) | | |
| Continued with ARV after delivery | Yes | 15(20.8) | 57(79.2) | 0.070 | 0.79 |
| | No | 11(19.0) | 47(81.0) | | |

### 4.5.2 Children using ARV prophylaxis after delivery and HIV status of HIV exposed children.

A total of 60 (46.2%) of the mothers their children started ARV prophylaxis after delivery, however only 56.2% of them started ARV prophylaxis within 72 hours and only 7.7% of them continue with ARV prophylaxis until when they stopped breastfeeding. The results show that 60 (85.7%) of children who were not taking ARV prophylaxis were HIV negative compared to 44(73.3%) who were taking ARV prophylaxis, however the difference was not statistically significant ($\chi^2$ =3.09, p = 0.079). (Table 9)

**Table 9: Children taking ARV after delivery and HIV status of HIV exposed children (N=130)**

| | | HIV status of HIV exposed Children | | $\chi^2$ | P - value |
|---|---|---|---|---|---|
| | | HIV+ n(%) | HIV- n(%) | | |
| Children taking ARV after delivery | Yes | 16(26.7) | 44(73.3) | 3.09 | 0.079 |
| | No | 10(14.3) | 60(85.7) | | |

**4.5.3 Infant feeding options and HIV status of HIV exposed children.**

About 72% of mothers opted for safe feeding practices (exclusive breastfeeding and replacement feeding) compared to 36 (27.7%) who opted unsafe feeding option (mixed feeding). About 86% of mother opted safe feeding practices their children were not infected with HIV compared to 63.9 who opted unsafe feeding practice (mixed feeding). The difference was statistically significant ($\chi^2 = 8.07$, $p = 0.004$). (Table 10)

Logistic regression analysis was done to find the association between infant feeding option and HIV status of HIV exposed children. The results show that women who practiced safe feeding (exclusive breastfeeding and replacement feeding) options to their exposed children were 3.5 times more likely that their exposed children were not infected compared to women who practiced mixed feeding practices and the difference was statistically significant (OR = 3.52, CI = 1.435, 8.64).

**Table 10: Infant Feeding options and HIV status of HIV exposed children (N=130)**

| | | HIV status of HIV exposed Children | | $\chi^2$ | P – value |
|---|---|---|---|---|---|
| | | HIV+ n(%) | HIV- n(%) | | |
| Infant Feeding Option | Exclusive breast feeding | 13(13.8) | 81(86.2) | 8.07 | 0.004 |
| | Mixed feeding | 13(36.1) | 23(63.9) | | |

Logistic regression analysis was done to determine the influence of utilizing PMTCT services on the HIV status of HIV exposed children. The model containing two independent categorical variables: mothers taking ARV during pregnancy and safe child feeding practice. The full model containing two predictor variables was statistical significant. (**Table 11**)

**Table 11: Logistic regression analysis – PMTCT services utilization associated with HIV status of HIV exposed children**

| Services Utilized | Categories | Adjusted OR | 95% CI | | p- value |
|---|---|---|---|---|---|
| | | | Lower | Upper | |
| Mother taking ARV during Pregnancy | Yes | 8.278 | 2.635 | 26.004 | 0.001 |
| | No | | | | |
| Opted for safe child feeding practice | Yes | 3.342 | 1.266 | 8.819 | 0.015 |
| | No | | | | |

# CHAPTER FIVE

# DISCUSSION

## 5.1 Cumulative utilization of PMTCT services and Prevalence of HIV among HIV exposed Children

In this study, roughly one third of the mother-baby pairs did not receive any form of ARV's for PMTCT. Patient attrition coupled with a relatively lower ANC attendance rate (recommended four or more), 43% and lower facility delivery of 44% in rural Tanzania [45], is likely to contribute to the suboptimal uptake of ARV prophylaxis for PMTCT observed in this study. Regardless of PMTCT services utilization Prevalence of HIV among exposed children aged between 6 to 24 months observed to be 20%. The HIV transmission rate of 15.5% observed for babies between the ages of six month and 2 years where mother received ARV for PMTCT, and 58.7% where mother not received ARVs, indicates that PMTCT interventions are effective in a resource-limited programme setting and that, there was association between PMTCT services utilization and the HIV status of HIV exposed children.

These findings compare reasonably with related studies on HIV transmission rates in PMTCT programme settings. In Zambia, it was observed that the transmission rates among babies between zero and six weeks old for the two categories of mother-baby pairs mentioned received ARV's and not received ARV's were 6.5% and 20.9%, respectively [48]. Similarly a study in South Africa by Mnyani et al recorded an overall transmission rate of 5.8% for HIV exposed babies between four and six weeks of age, where both mother and baby received some form of ARVs for PMTCT [49].

## 5.2 Utilization of PMTCT services during ANC and HIV status of HIV exposed Infants

For any PMTCT programme to effectively prevent vertical transmission of HIV between mother and baby, a pregnant woman must successfully follow the PMTCT cascade beginning with acceptance of HIV counseling and testing to receiving ARV prophylaxis (if HIV positive) and safe infant feeding practices. Uptake of services provided in this cascade has been shown to be feasible in resource limited settings by studies conducted in Zambia and Ivory Coast where more than 80% of ANC attendees accepted the HIV test and a majority of the HIV positive women commenced ARV prophylaxis even though there were reports of patient attrition between the testing for HIV and commencement of ARV prophylaxis for PMTCT [46, 47].

## 5.3 Breast feeding and HIV test status of HIV exposed children

In this study, over 87% of the exposed children screened for HIV were breastfed. This finding is consistent with a related study in Zambia which showed that about 84% of HIV exposed infants whose records were reviewed had ever been breastfed [50]. In addition, our analysis indicated that regardless of PMTCT intervention received by the mothers, there was a decrease in transmission rates for children who were exclusively breastfed compared to those who had mixed feeding. Prolonged exposure to breastfeeding is likely to have affected HIV transmission rates for Children. Moreover, the observed transmission rates in this study were considerably higher for babies who had mixed feeding compared with those who were exclusively breastfed; this suggests that exclusive breastfeeding is safer than mixed feeding as a feeding option for HIV exposed infants.

This finding is consistent with evidence from the ZVITAMBO project in Zimbabwe, which demonstrated that compared with early breastfeeding, early mixed feeding was associated with a four-fold risk of HIV transmission at six months of age for HIV-exposed babies who had previously tested negative at six weeks of age [51]. The 2010, WHO guidelines on HIV and infant feeding recommend that, provided the mother and/or baby is receiving ARVs for

their health or as prophylaxis, exclusive breastfeeding should be practiced by HIV-infected mothers for the first six months of life. After the six month period, complimentary feeding should be introduced while continuing with breastfeeding for up to 12 months of age unless replacement feeding is acceptable, feasible, affordable, sustainable and safe for them and their infants before that time [52].

The PMTCT guidelines in Tanzania endorses the WHO guidelines on infant feeding, however the reality is that pregnant women who test positive face a difficult decision about how to feed their babies which is complicated by poor access to proper feeding counseling support and the influence of family members of culturally and socially accepted feeding methods. This ultimately results in improper infant feeding practices as demonstrated by the high rate of mixed feeding practiced by the HIV positive mothers in this study. Accurate information, clear infant feeding guidance, and ongoing support by healthcare workers and family members will help HIV positive mothers succeed with their chosen strategies.

# CHAPTER SIX
# CONCLUSION AND RECOMMENDATIONS

## 6.1 Conclusion

The findings of this study demonstrate that many HIV positive mothers utilizes PMTCT services either during pregnancy, labour and/or after delivery, however few HIV positive mothers utilize comprehensive PMTCT services starting at ANC, labour and delivery and after delivery. The association between utilization of PMTCT services among HIV-positive mothers and HIV status of their exposed children observed only for taking ARV prophylaxis for PMTCT or ARV for treatment during ANC and infant feeding practices. Majority of mothers who utilized PMTCT services during and after delivery their children were not infected compared to mothers who were not utilizing the services, the differences was not statistically significant. Therefore there was no association between PMTCT services utilization and HIV status of their HIV exposed children among mothers who were utilized PMTCT services during labour and after delivery.

It is known that, reduction in maternal-to-child transmission of HIV is possible with effective PMTCT intervention. Increase in the uptake comprehensive PMTCT services and ensuring appropriate infant feeding practices is critical in reducing vertical transmission of HIV. Although most of the exposed children who are not infected with HIV are not associated with utilization of comprehensive PMTCT services, the Mother to Child transmission of HIV could be reduced to less than five percent if effective and comprehensive PMTCT interventions are implemented.

## 6.2 Recommendations

Strategies to address programmatic challenges of lower ANC attendance rate (recommended four or more visits) 43% in Tanzania which contribute to low uptake of ARV prophylaxis for PMTCT during pregnancy observed in this study are essential.

Strategies to address programmatic challenges of lower facility delivery of 44% and low post-natal care attendance in rural Tanzania which contribute to low uptake of ARV prophylaxis for PMTCT during labour and after delivery observed in this study are essential.

Enhanced, explicit and repeated counseling regarding the risks associated with mixed feeding.

Further studies are needed to assess perception of community and service provider on PMTCT services utilization and effective coverage.

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# APPENDICES

## APPENDIX 1a: Informed consent, English version.

**Introduction:**

"My name is ……. I am working on this research project with the objective of determine the association of utilization of PMTCT services among HIV-positive mothers and HIV test results of HIV-exposed children attending post-natal clinic in Mtwara District. We're interviewing HIV positive women who had exposed children aged from 6 to 24 months, who their HIV status are known and they are no longer breastfed.

**Purpose of the study**

The purpose of the interview is to collect information from those women on utilization of PMTCT services during pregnancy, labour and delivery as well as after delivery. The findings of this study will help the principal investigator to write a dissertation which is a partial fulfillment of Master of Public Health for the academic year 2011/2012.

**What participation Involves**

If you agree to participate in this study the following will occur:

1. You will sit with interviewer and answer questions.
2. You will be interviewed only once for approximately 20-30 minutes in a private setting. After the interview you will be given incentive of 3,000 Tshs for your participation.

**Confidentiality and consent:**

"I'm going to ask you some very personal questions that some people find difficult to answer. Your answers are completely confidential. Your name will not be written on this form, and will never be used in connection with any of the information you tell me. You do not have to answer any questions that you do not want to answer, and you may end this interview at any time you want to. However, your honest answers to these questions will

help us better understand the association of PMTCT services utilization and HIV test results of exposed children. Can I go ahead? We would greatly appreciate your help in responding to this survey. The interview will take about 20-30 minutes. Are you willing to participate?"

**Who to contact**

If you ever have questions about this study, you should contact Principal Investigator, **Nassor S. Mohamed**, Muhimbili University of Health and Allied Sciences (MUHAS), P.O. Box 65001, Dar es Salaam.

If you have questions about your right as a participant, you may call **Prof. Aboud M**, Chairman of the College Reasearch and Publications Committee, P.O. Box 65001, Dar es Salaam. Tel: 2150302-6 and **Prof. K. S. Mnyika** who is the supervisor of this study.

Agreement of the Participant

Do you agree?

Yes ☐

No ☐

I …….. have read and understood the contents in this form. My questions have been answered. I agree to participate in this study.

Signature of participants ……..

Signature of research assistant……..

Date of signed consent …….

**APPENDIX 1b: Ridhaa ya kushiriki katika utafiti.**

**Utangulizi:**

Mimi naitwa …… nafanyakazi katika mradi wa utafiti ambao unalengo la kutafiti juu ya mahusiano kati ya matumizi ya huduma ya kuzuia maambukizi ya VVU toka kwa mama kwenda kwa mtoto na matokeo ya kipimo cha VVU kwa watoto waliozaliwa na mama wenye VVU wanaohudhuria kliniki Halmashauri ya Wilaya ya Mtwara. Katika utafiti huu tunawahoji wakina mama wanaoishi na VVU ambao wanawatoto wenye umri kati ya miezi 6 hadi 24 ambao watoto wao tayari wameshapima VVU na ambao hawaendelei kunyonyesha maziwa ya mama.

**Lengo la utafiti huu.**

Utafiti huu unalengo la kukusanya takwimu juu ya matumizi ya huduma ya Kuzuia maambukizi ya VVU toka kwa mama kwenda kwa mototo, wakati wa ujauzito, kujifungua, na baada ya kujifungua na kuzihusishanisha na matokeo ya VVU ya watoto waliozaliwa na wakina mama wenye VVU. Matokeo ya utafiti huu yatamsaidia Mtafiti mkuu kuandaa taarifa ya utafiti ambayo ni sehemu ya mahitaji ya kukamilisha Shahada ya uzamili ya afya ya jamii kwa mwaka wa masomo 2011/2012 katika chuo kikuu cha Afya Muhimbili.

**Ushiriki katika utafiti huu utahusisha;**

Kama utakubali kushiriki katika utafiti huu yafuatayo yatafanyika:

1. Utakaa na mtafiti msaidizi na kujibu maswali atakayo kuuliza.
2. Utahojiwa mara moja tu kwa muda takribani dakika 20-30 katika mazingira ya faragha. Baada ya mahojiano utalipwa kiasi cha Shs. 3,000/= kwa ushiriki wako.

**Usiri na ridhaa ya ushiriki:**

Nitakuuliza maswali ambayo mengine yanaweza yakawa ya binafsi ambayo baadhi ya watu huona ugumu kijibu. Majibu yako yatakuwa ni siri. Jina lako halita andikwa katika dodoso na kwamwe majibu utakayo yatoa hayata tumika kwa mana nyingine yoyote isipokuwa kwa lengo la utafiti huu tu. Hutalazimika kujibu swali lolote ambalo hutakuwa tayari kujibu na unaweza kusitisha mahojiano haya wakati wowote utakapo jisikia kufanya

hivyo. Ingawaje majibu yako yatasaidia kujua ni kwa kiasi gani huduma za kuzuia maambukiza ya VVU toka kwa mama kwenda kwa mototo yameweza kusaidia kupunguza maambukizi ya VVU kwa watoto waliozaliwa na mama wenye VVU. Je naweza kuendelea na mahojiano? Nitashukuru sana kama utanisaidia kujibu maswali ya utafiti huu. Mahojiano yatachukua takribani dakika 20-30. Je ukotayari kushiriki?

**Watu wa kuwasiliana nao:**

Kama utakuwa na swali lolote kuhusu utafiti huu, wasiliana na Mtafiti mkuu **Bw. Nassor S. Mohamed,** Chuo Kikuu cha Sayansi za Afya Muhimbili S.L.P 65001, Dar es Salaam

Kama unaswali lolote kuhusu haki zako za kushiriki, wasiliana na **Prof. Aboud M**, mwenyekiti wa kamati ya utafiti na machapisho ya chuo kikuu Muhimbili, S.L.P 65001, Dar es Salaam. Simu: 2150302-6 na **Prof. K. S. Mnyika** ambaye ni msimamizi wa utafiti huu.

Makubaliano na mshiriki

Je umekubali?

Ndio ☐

Hapana ☐

Mimi …….. nimesoma/nimesomewa na kuelewa yaliyomo kwenye fomu hii. Maswali yangu yote yamejibiwa. Nimekubali kushiriki katika utafiti huu.

Sahihi ya mshiriki……..

Sahihi ya mtafiti msaidizi……..

Tarehe …….…….

**APPENDIX 2a: Questionnaire**

ASSOCIATION OF HIV TEST RESULT AMONG HIV-EXPOSED CHILDREN AND UTILIZATION OF PMTCT SERVICES AMONG POSITIVE MOTHERS AND THEIR CHILDREN IN MTWARA DISTRICT

| |
|---|
| Questionnaire No…….. |
| Respondent No…… |
| Research assistant No…….... |
| Date of Interview…… |
| Name of health facility…… |

**PART 1: DEMOGRAPHIC INFORMATION**

1. How old are you? …….
2. Please state your level of education

☐ Primary level ☐ Secondary Level
☐ College/University level ☐ No formal education

3. What is your marital status?

☐ Single ☐ Married ☐ Cohabiting
☐ Divorced ☐ Widowed

4. What is your occupation?

☐ Teacher ☐ Nurse ☐ Farmer
☐ Housewife ☐ Businesswoman ☐ Other (Specify)

5. In which village did you live? ……
6. How many children do you have?.....
7. How old is your youngest child? ……
8. Did you have another child aged less than two years? (If the youngest child is below one year)

☐ Yes ☐ No

**PART 2: UTILIZATION OF PMTCT SERVICES DURING PREGNANCY**

9. During your pregnancy did you attend Antenatal care? (If NO go to question 13 )

☐ Yes ☐ No

10. At what age of gestation did you attend the first ANC visit?

☐ First trimester ☐ Second trimester ☐ Third trimester

11. How many ANC visit did you make all together?

☐ One ☐ Two ☐ Three ☐ Four

12. During ANC visit did you heard anything about PMTCT?

☐ Yes ☐ No

13. Can a mother who is HIV positive and healthy transmit the virus to the baby? (If NO go to question # 17)

☐ Yes ☐ No

14. If yes can the virus pass from mother to the baby,

☐ During pregnancy ☐ Labour and delivery ☐ During breastfeeding

15. Are there ways in which this transmission can be prevented?

☐ Yes ☐ No

16. If yes which one?

☐ Taking Nevirapine by mother and baby ☐ Replacement Feeding

☐ Exclusive B/Feeding then abrupt weaning at 6 months ☐ Others (specify)……

17. Were you aware of your HIV status before getting pregnancy? (If NO skip question #18)

☐ Yes ☐ No

18. If yes. Were you on ART treatment before pregnancy? (If NO go to Question # 24)

☐ Yes ☐ No (If YES go to Question # 29)

19. If no. Were you offered special information (counseling) about HIV/AIDS at your first ANC visit?

☐ Yes ☐ No

20. Were you offered that information some other time during pregnancy?

☐ Yes ☐ No

21. Were you offered HIV test during ANC?

☐ Yes ☐ No

22. Did you decide to test HIV during pregnancy?

☐ Yes ☐ No

23. Did you take the result?

☐ Yes ☐ No

24. Were you offered ARV prophylaxis, that can help to prevent you baby from HIV infection?

☐ Yes ☐ No

25. Did you take the drugs (ARV prophylaxis)? (Show her a sample of the tablet)

☐ Yes ☐ No

26. At what pregnancy stage were you given the drug?

☐ First trimester ☐ Second trimester ☐ Third trimester

27. At what pregnancy stage did you take the drug?

☐ First trimester ☐ Second trimester ☐ Third trimester

28. For how long were you taking the drugs during pregnancy?

☐ Less than a month ☐ 1-2 months ☐ more than 2 month

**PART 3: UTILIZATION OF PMTCT SERVICES DURING LABOUR AND DELIVERY**

29. Where were you deliver you baby? (tick at home for any answer other than health facility)

☐ At home ☐ Health facility (mention the name of the health facility)

**NB: Instructions**

For those with unknown HIV status who delivered at home, go to question # 34

For those with known HIV status who delivered at home and they were on ARV, go to question # 37

For those with known HIV status who delivered at home and they were not on ARV, go to question #35

For those with known status and delivered at HF go to Question #33

For those with unknown status and delivered at HF continue with questions

30. Were you counseled for HIV test during labour and delivery?

☐ Yes ☐ No

31. Were you testing for HIV during labour and delivery?

☐ Yes ☐ No

32. Did you take the HIV test result?

☐ Yes ☐ No

33. Were you offered ARV prophylaxis during labour and delivery?

☐ Yes ☐ No

**PART 4: UTILIZATION OF PMTCT SERVICES AFTER DELIVERY**

For those who delivered at home with unknown HIV status. (Ask question No. 35-37, and then skip No.38 and continue)

34. When did you know you HIV status after delivery?

☐ Within 3 days after delivery ☐ More than 3 days after delivery

35. Did you given ARV prophylaxis after delivery? (If NO go to question # 39)

☐ Yes ☐ No

36. When did you start taking the ARV prophylaxis?

☐ Within 3 days after delivery ☐ More than 3 days after delivery

37. Did you continue with ARV prophylaxis after delivery? (If NO skip question # 38)

☐ Yes ☐ No

38. For how long were you taking ARV prophylaxis after delivery?

☐ 7 days ☐ 28 days ☐ More than 28 days

39. Did you children started ARV prophylaxis? (If NO go to question # 42)

☐ Yes ☐ No

40. When did your child start ARV prophylaxis after delivery?

☐ Within 72 hours ☐ after 72 hours

41. For how long did your child take ARV prophylaxis?

☐ 7 days ☐ 28 days ☐ more than 28 days

42. What feeding option did you chose for your baby?

☐ Exclusive breastfeeding ☐ Replacement feeding ☐ Mixed feeding

43. At what age did you stop breastfed your child?

☐ 3 months ☐ 6 months ☐ more than 6 months

44. Did you child tested for HIV at 6 weeks or more after complete cessation of breastfeeding?

☐ Yes ☐ No

45. Would you mind telling me the test result of your child? (If NO end the interview)

☐ Yes ☐ No

46. What was the HIV test result of child?

☐ HIV-Positive ☐ HIV-Negative

**APPENDIX 2b: DODOSO**

MAHUSIANO KATI YA MATUMIZI YA HUDUMA ZA KUZUIA MAAMBUKIZI YA VVU KWA WAKINAMAMA NA HALI YA MAAMBUKIZI YA VVU KWA WATOTO WALIOZALIWA NA WAKINAMAMA WENYE VVU HALMASHAURI YA WILAYA MTWARA

Namba ya Dodoso ……..

Namba ya Mshiriki ……

Namba ya Mtafiti msaidizi……..

Tarehe ya usaili……

Jina la kituo ……

**SEHEMU YA 1: TAARIFA BINAFSI ZA MAMA**

1. Una umri gani? ……
2. Una kiwango gani cha elimu?
   ☐ Elimu ya msingi ☐ Elimu ya sekondari
   ☐ Chuo/Chuo kikuu ☐ Sina elimu maalumu
3. Hali yako ya ndoa?
   ☐ Sijaolewa ☐ Nimeolewa ☐ Naishi na mwenza
   ☐ Nimeachika ☐ Mjane
4. Unafanya kazi gani?
   ☐ Mwalimu ☐ Muuguzi ☐ Mkulima
   ☐ Mama wa nyumbani ☐ Mfanyabiashara ☐ Nyingine (Taja)

5. Unaishi katika kijiji gani? ……
6. Una watoto wangapi?.....
7. Mtoto wako mdogo ana umri gani? ……

8. Je una mtoto mwingine mwenye umri chini ya miaka miwili? (kama mtoto mdogo ana umri chini ya mwaka mmoja)

☐ Ndio ☐ Hapana

**SEHEMU 2: MATUMIZI YA HUDUMA YA KUZUIA MAAMBUKIZI YA VVU TOKA KWA MAMA KWENDA KWA MTOTO WAKATI WA UJAUZITO**

9. Je wakati wa ujauzito ulihudhuria kliniki? (kama HAPANA nenda swali No. 13)

☐ Ndio ☐ Hapana

10. Umehudhuria kliniki kwa mara ya kwanza ukiwa na ujauzito wa muda gani?

☐ Mwezi 1-3 ☐ Mwezi 3-6 ☐ Mwezi wa 6-9

11. Je umehudhuria kliniki mara ngapi kwa kipindi chote cha ujauzito?

☐ Mmoja ☐ Mbili ☐ Tatu ☐ Nne ☐ Zaidi ya Nne

12. Wakati ulipohudhuria kliniki ulisikia chochote juu ya huduma ya kuzuia maambukizi ya VVU toka kwa mama kwenda kwa mtoto?

☐ Ndio ☐ Hapana

13. Je mama mwenye ujauzito ambaye anaishi na VVU anaweza kumuambukiza mtoto aliyetumboni? (kama hapana nenda swali # 17)

☐ Ndio ☐ Hapana

14. kama ndio. Je virusi vinaweza kutoka kwa mama kwenda kwa mtoto.

☐ Wakati wa ujauzito ☐ Wakati wa kujifungua ☐ Wakati wa kunyonyesha

15. Je, kuna njia yoyote ya kuzuia maambukizi ya VVU toka kwa mama kwenda kwa mtoto?

☐ Ndio ☐ Hapana

16. Kama ndio ni zipi?

☐ Kutumia dawa (Nevirapine) kwa mama na mtoto

☐ Lishe mbadala wa maziwa ya mama

☐ Maziwa ya mama pekee kwa miezi sita

☐ Nyingine (taja) ……

17. Je ulikuwa unafahamu hali yako ya maambukizi ya VVU kabla ya ujauzito? (kama HAPANA ruka swali #18)

☐ Ndio ☐ Hapana

18. Kama NDIO. Je, ulikuwa kwenye tiba ya dawa (ART) kabla ya ujauzito? (kama NDIO nenda swali # 29)

☐ Ndio ☐ Hapana

19. Je, ulipatiwa huduma ya ushauri nasaha ulipo hudhuria kliniki kwa mara ya kwanza?

☐ Ndio ☐ Hapana

20. Je, ulipata huduma hiyo muda mwingine wakati wa ujauzito?

☐ Ndio ☐ Hapana

21. Je, ulipata huduma ya upimaji wa VVU wakati wa ujauzito?

☐ Ndio ☐ Hapana

22. Je, ulipima VVU wakati wa ujauzito?

☐ Ndio ☐ Hapana

23. Je, ulipokea majibu?

☐ Ndio ☐ Hapana

24. Je, ulipatiwa dawa za kinga (ARV prophylaxis) kwa ajili ya kuzuia maambukizi ya VVU kwenda kwa mtoto? (muonyeshe mama mfano wa ARV)

☐ Ndio ☐ Hapana

25. Je, ulitumia dawa hizo?

☐ Ndio ☐ Hapana

26. Ni katika umri gani wa ujauzito ulipatiwa dawa hizo?

☐ Mwezi 1-3 ☐ Mwezi 4-6 ☐ Mwezi 7-9

27. Ni katika umri gani wa mimba ulitumia dawa hizo?

☐ Mwezi 1-3 ☐ Mwezi 4-6 ☐ Mwezi 7-9

28. Ni kwa muda gani umetumia dawa hizo wakati wa ujauzito?

☐ Chini ya mwezi mmoja ☐ Mwezi 1-2 ☐ Zaidi ya miezi 2

**SEHEMU 3: MATUMIZI YA HUDUMA YA KUZUIA MAAMBUKIZI YA VVU TOKA KWA MAMA KWENDA KWA MTOTO WAKATI WA UCHUNGU/KUJIFUNGUA**

29. Ulijifungulia wapi mtoto wako?

☐ Nyumbani ☐ kituo cha afya (Taja jina la kituo……..)

**NB: Maelekezo**

Kwa wote ambao walijifungulia nyumbani na hali yao ya kimaambukizi ilikuwa haijafahamika nenda swali 34

Kwa wote ambao walijifungulia nyumbani na hali yao ya kimaambukizi ilikuwa inafahamika nenda swali # 37

Kwa wote waliokuwa hali zao za maambukizi zinafahamika ambao walijifungulia nyumbani na walikuwa katika tiba ya ARV, nenda swali #35

Kwa wote ambao hali zao za kimaambukizi zilifahamika na walijifungulia kwenye kituo cha afya, nenda swali #33

Kwa wote ambao hali zao za kimaambukizi hazikufahamika na walijifungulia kituoni, endelea na maswali.

30. Je ulipata huduma ya ushauri nasaha juu ya kupima VVU wakati wa uchungu/kujifungua?

☐ Ndio ☐ Hapana

31. Je ulipata huduma ya kupima VVU wakati wa uchungu/kujifungua?

☐ Ndio ☐ Hapana

32. Je ulipima VVU?

☐ Ndio ☐ Hapana

33. Je ulipatiwa dawa kwa ajili ya kuzuia maambukizi ya VVU kwenda kwa Mtoto?

☐ Ndio ☐ Hapana

**SEHEMU 4: MATUMIZI YA HUDUMA YA KUZUIA MAAMBUKIZI YA VVU TOKA KWA MAMA KWENDA KWA MTOTO BAADA YA KUJIFUNGUA**

Kwa wote waliojifungua nyumbani ambao hali yao ya maambukizi ya VVU haikujiulikana. (Uliza swali No. 35-37, ruka No.38 na endelea)

34. Ni muda gani ulijua hali yako ya maambukizi baada ya kujifungua?

☐ Ndani ya siku 3 baada ya kujifungua ☐ Zaidi ya siku 3 baada ya kijifungua

35. Je, ulipatiwa dawa za kuzuia maambukizi ya VVU (ARV) kwenda kwa mtoto? (Kama HAPANA nenda swali # 39)

☐ Ndio ☐ Hapana

36. Je, lini ulianza kutumia dawa (ARV) kwa ajili ya kuzuia maambukizi ya VVU kwenda kwa mtoto?

☐ Ndani ya siku 3 baada ya kujifungua ☐ Zaidi ya siku 3 baada ya kujifungua

37. Je, uliendelea na dawa (ARV) baada ya kujifungua? (kama Hapana nenda swali # 38)

☐ Ndio ☐ Hapana

38. Je, ni kwa muda gani umekuwa ukitumia dawa (ARV) baada ya kujifungua?

☐ Siku 7 ☐ Siku 28 ☐ Zaidi ya siku 28

39. Je, mtoto wako anatumia dawa (ARV)? (Kama HAPANA nenda swali # 42)

☐ Ndio ☐ Hapana

40. Ni lini mtoto wako alianza kutumia dawa (ARV)?

☐ Ndani ya saa 72 baada ya kujifungua ☐ Zaidi ya saa 72 baada ya kujifungua

41. Ni kwa muda gani mtoto wako ametumia dawa (ARV)?

☐ Siku 7 ☐ Siku 28 ☐ Zaidi ya siku 28

42. Je, ni njia gani ya ulishaji uliichagua kumlisha mtoto wako?

☐ Maziwa ya mama pekee ☐ Maziwa/Chakula mbadala

☐ Mchanganyiko wa maziwa ya mama na maziwa/chakula kingine

43. Je, nikatika umri gani ulimuachisha mtoto wako maziwa ya mama?

☐ Miezi 3 ☐ Miezi 6 ☐ Zaidi ya miezi 6

44. Je, mtoto wako amepimwa VVU akiwa na umri wa miezi sita au zaidi baada ya kuacha kunyonya maziwa ya mama?

☐ Ndio ☐ Hapana

45. Je, utaridhia kunijulisha matokeo ya mtoto wako ya kipimo cha VVU? (Kama HAPANA ishia hapa)

☐ Ndio ☐ Hapana

46. Je, matokeo ya kipimo cha VVU kwa mtoto wako yalikuwaje?

☐ Aligundulika kuwa na VVU ☐ Aligundulika hakuwa na VVU