UTILIZATION OF THE EARLY INFANT DIAGNOSIS OF HIV INFECTION AND ITS ASSOCIATED FACTORS IN COAST REGION TANZANIA.

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UTILIZATION OF THE EARLY INFANT DIAGNOSIS OF HIV INFECTION AND ITS ASSOCIATED FACTORS IN COAST REGION TANZANIA.

By

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A dissertation submitted in (partial) fulfillment of the requirement for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences, School of Public Health and Allied Sciences

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CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a thesis/dissertation entitled ***Utilization of the Early infant diagnosis of HIV infection and associated factors in Coast region, Tanzania***, in partial fulfillment of the requirements for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences.

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DATE

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DEDICATION

This dissertation is dedicated to my wife Doreen, daughter Margaret, son Darren and to all my family. All were together with me provide the support which has made me to accomplish this work.

ABSTRACT

Background: Early infant diagnosis (EID) of HIV infection provides the opportunity for identifying, follow up and testing for HIV-exposed infants. This potentially confers benefit to both HIV-infected, uninfected infants and their families through proper counseling, linkages to comprehensive HIV care, safe infant feeding options and follow up for growth monitoring and development. In Tanzania, despite of availability of EID of HIV infection testing services, many children are left undiagnosed or diagnosed late that resulted to increased childhood HIV related mortalities.

Objectives: To determine magnitude and factors influencing utilization of EID among HIV-exposed infants as tracer factors to be shared at different levels of policy making to facilitate planning and proper implementation of EID for HIV.

Methodology: A cross-sectional study was conducted in Kibaha and Bagamoyo districts in Coast region involving all HIV-exposed infants aged between 4 weeks to 18 months born live to HIV-infected mothers. Data were collected through interviewing mothers/guardians of HEI using a structured questionnaire, CTC cards were used to countercheck linkage to CTC. A checklist was used to collect data specific for health facilities through interview of health care providers and observation. Data were entered into Epidata version 3.1 analysed by Stata software 12.1. Analysis for predictors was done using univariate and multivariate logistic regression where p value of <0.05 was considered as statistically significant.

Results: A total of 238 parents/guardians of HIV-exposed infants/children from five (5) facilities in Coast region were involved in the study. The HIV testing among HIV-exposed infants within the health care facility was 87%. The prevalence of HIV infection among HIV-exposed infants who were tested by HIV-1 DNA PCR method was 13%. All facilities had availability of commodities for EID of HIV, trained human resources, system of identification of HIV-exposed infants. In univariate analysis, early HIV testing during pregnancy, PMTCT ARV prophylaxis, disclosure of HIV status, enrollment to CTC, frequent attendance to EID services, co-trimoxazole prophylaxis and exclusive breast feeding were found to be significant predictors for testing of HIV-exposed infants. In

multivariate analysis, monthly attendance to HIV EID clinic was independent significant predictor (AOR 2100, 95% CI, 3.3 -1314904 $p<0.05$) for testing of HIV-exposed infants.

Conclusions: High utilization of EID and decreased prevalence of HIV infection coupled with availability of commodities for identifying and testing, skilled health care providers and PMTCT services coverage with availability of more efficacious drugs were found among Tanzanian HIV-exposed infants. Monthly attendance to HIV EID clinic predicted significantly the testing among HIV-exposed infants however cotrimoxazole prophylaxis was not a predictor for HIV testing among exposed infants.

Recommendations: The Tanzania government should focus on implementation of global plans for elimination of Mother to child HIV transmission (e-MTCT) through strengthening of the existing system and collaboration with different partners stakeholders to scale up EID services to all levels of health facilities.

The Ministry of Health should strengthen the existing health system to ensure uninterrupted supply of PMTCT/EID consumables and proper service delivery.

The community should be sensitized on early HIV testing during pregnancy, appropriate PMTCT intervention and early and consistent follow up of mother infant pair for proper HIV intervention..

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ABBREVIATIONS

AIDS…….. Acquired immunodeficiency syndrome
ANC …….. Antenatal clinic
AOR ……. Adjusted Odds Ratio
ARI …….. Acute respiratory infection
ART ……. Antiretroviral therapy
ARV ……. Antiretroviral
CI …….. Confidence Interval
CTC…… Care and treatment center
DBS …….. Dried blood spot
DED …….. District Executive Director
DNA ……...Deoxyribonucleic acid
EID……. Early infant Diagnosis
EMS…… Express mail service
HCW……... Health care worker
HEI ……. HIV-exposed infant
HIV ……. Human immunodeficiency virus
MTCT ……. Mother to child transmission
MUHAS ……. Muhimbili University of Health and Allied Sciences
OR ……. .Odds Ratio
PCR …….Polymerase chain reaction
PEPFAR ……. President Emergency Plan for AIDS Relief
PLWHA …….. People living with HIV/AIDS
PMTCT ……... Prevention of mother to child HIV transmission
RAS ……. Regional Administrative Secretary
RCH ……...…… Reproductive and child's health
SMS …… Short message service
Tb ……...Tuberculosis
UNICEF ……..United Nation Children's Funds
UNGASS ……...United Nation General Assembly
WHO …….World Health Organization

CHAPTER ONE: INTRODUCTION

1.1 Background

Globally, it is estimated that more than 33.3 million people were living with human immunodeficiency virus (HIV) and acquired immuno deficiency syndrome (AIDS) in 2009, over half of them were women (UNAIDS, 2010). Mother to child transmission of HIV (MTCT) accounts for about 90% of HIV infection in infants and young children. It has been reported that over 370,000 infants acquire HIV infections globally each year with an approximately over 1000 children acquiring HIV every day (UNAIDS, 2010). HIV infections in infants and young children occur during pregnancy, labor and delivery and postnatal through breast feeding. In breastfeeding populations 15-45% of infants born to HIV- infected mothers acquire HIV infection without any intervention (WHO PMTCT Strategic Vision, 2010-2015).

The sub-Saharan Africa (SSA) is highly affected by HIV with an estimated 22.5 million people living with HIV/AIDS in representing 68% of global HIV and AIDS burden. Women and girls in SSA are excessively affected by HIV/AIDS with an estimated 12 million accounting for 76% of all women with HIV and AIDS globally (UNAIDS, 2010).

In Tanzania where 1,400,000 of people are living with HIV and AIDS, 730,000 women and 160,000 children below 15 years of age are infected with HIV and AIDS (UNAIDS, 2010)

Prevention of mother to child transmission (PMTCT) of HIV is an intervention which provides mothers with counseling, antiretroviral (ARV) drugs and psychological support to help prevent the infants against HIV infection. The intervention aimed to ensure no baby is born with HIV infection by 2015 (UNICEF, 2010). PMTCT services ensure primary prevention of HIV among women of reproductive age, appropriate counseling of HIV infected women to enable decision about their future reproduction in an attempt to prevent unintended pregnancies, ensure pregnant women receive HIV testing and access to ARV drugs for their health and prevention of infection to babies. PMTCT also provides HIV care, support and treatment to HIV-infected women and the families. It has been

emphasized that PMTCT services must be consistently scaled up to reach all pregnant mothers and children in need regardless of the geographical locations and all should receive effective available drugs (UNICEF, 2010).

HIV related childhood mortality is still high in SSA despite of availability of antiretroviral therapy (ART) (Cook et al, 2011) HIV-infected infants and young children have increased risk of death due to rapid progression of disease (Nuwagaba et al, 2010). It is estimated that up to 30% of untreated HIV-infected children die before 12 months and more than 50% die before 2 years of age (Cook et al, 2011), implying the urgent need for identifying and enrolling them into care and treatment programs.

Early Infant Diagnosis (EID) of HIV determines early HIV status and referral to comprehensive HIV and AIDS care and treatment of infected infants for proper intervention including institution of life-long ART. EID of HIV is done using either detection of infant blood RNA or DNA. In resource-limited settings, HIV-1 DNA polymerase chain reaction (PCR) test using venous blood has been used for EID of HIV in children less than 18 months (Aboud et al 2010). Several studies have documented the transfer from venous blood to dried blood spot (DBS) specimen (Aboud et al, 2010).

Whole blood can easily be coated on the filter paper from heel stick or finger punctures in infants; thus avoiding the use of syringes and vacutainer tubes. Blood coated on filter paper lyses the cells and binds the DNA. Therefore, the sample centrifugation and extraction procedures are eliminated (Mini et al, 2008). Dried blood on filter paper is biologically stable (Evengard et al, 1989) and can be stored at room temperature. It can be transported easily and therefore it is convenient to use the DBS specimens for EID of HIV in resource-limited settings (Mini et al, 2008).

EID of HIV has become a new priority for the US President Emergency Plan for AIDS Relief (PEPFAR) since 2006. Tanzania is among the resource-constrained countries that implemented EID of HIV through PEPFAR support. The program started in October 2006 as a pilot phase, scaled up to involve the entire country in 2007. HIV-exposed infants (HEI) receive testing when presented at immunization clinic at 4-6 weeks or thereafter till 18 months of age. The system of sample and results transportation is through public

transport, expedited mail service (EMS) and DHL depend on availability of these services. This has been practiced in many resource-poor settings including Tanzania through a chain of interaction between lower health facilities, district and specialized zonal PCR laboratory (Ciaranello et al, 2011).

1.2 Statement of research problem

It is estimated that 15% of HIV exposed infants in some resource-constrained settings accessed HIV early diagnosis in 2009 (WHO progress report, 2010). Approximately 85% of HIV exposed infants have unmet needs for HIV diagnosis using DNA PCR testing resulted from delayed presentation to HIV testing which has left many of children undiagnosed hence lead to increased childhood HIV related mortalities.

Identification of all HEI, initial DNA PCR testing, follow up for results, growth monitoring and final HIV status determination after complete weaning would ensure proper utilization of EID for HIV to many HIV exposed infants and young children.

In Tanzania, despite of availability of early HIV testing in infants and young children and high coverage of immunization program, utilization of early infant diagnosis of HIV infection has not been done consistently. Improper utilization of EID for HIV can be contributed by both psychosocial, socio demographic and health system factors which need to be addressed for proper and sustained EID service utilization.

1.3 Objectives

1.3.1 Broad Objective

To determine magnitude and factors influencing utilization of EID among HIV-exposed infants.

1.3.2 Specific Objectives

1.3.2.1 To determine the proportion of HIV testing among HIV-exposed infants.

1.3.2.2 To determine the prevalence of HIV infection among HIV-exposed infants.

1.3.2. 3 To determine the association between socio-demographic factors (age of mother, age of the child/infant, level of education, employment,

distance from facility, frequent visit to EID clinic) and testing of the HIV- exposed infants.

1.3.2.4 To determine the association between psychosocial factors (disclosure, mother in care and treatment clinic (CTC), relationship with caregiver, mother in PLWHA support group,) and testing of the HIV-exposed infants .

1.3.2.5 To determine the association between health facility factors (trained health care workers, HEI identification system, availability of EID materials, facility HIV support groups, sample& results transportation system) and testing of the HIV exposed infants .

1.4 Research questions

1.4.1 What is the proportion of HIV testing among HIV exposed infants?

1.4.2 What is the prevalence of HIV among HIV exposed infants?

1.4.3 What are factors associated with EID for HIV?

1.5 Rationale of the study

In Tanzania, EID for HIV infection is a new program in which no much is known regarding the extent of its utilization and various associated psychosocial and demographic factors. The study findings showed the proportion of testing, magnitude of HIV infection among HIV-exposed infants and young children and ascertained several factors that are associated with EID implementation which should be considered during the program roll out. The results and recommendations could be shared at different levels of policy making and implementation to facilitate planning and smooth implementation for proper utilization of services to meet the goal of the program

CHAPTER TWO: LITERATURE REVIEW

2.1 Mother to child transmission of HIV (MTCT)

An estimated 2.5 million children worldwide were living with HIV by the end of 2009, mostly had acquired through vertical transmission, and more than 90% of these children are in sub-Saharan region of Africa (Tejiokem et al, 2011). PMTCT of HIV is a strategy that has been found to reduce MTCT to 4% or less in many areas of the world (UNAIDS 2004). PMTCT services in Tanzania started in year 2000, its implementation is currently guided by the National PMTCT and pediatrics scale up plan (2009-2013) which aims to increase HIV positive pregnant women who take any form of ART from 34% in 2007 to 80% by 2012 (UNGASS/TACAIDS, 2010).

PMTCT provides HIV counseling and testing in pregnant women, ARV prophylaxis, infant feeding counseling, and comprehensive treatment of HIV-infected women and their families including follow up of infant for HIV testing at 4-6 weeks after delivery using virology tests. Implementation of HIV PMTCT in resource-constrained countries including Tanzania has been facing some potential bottlenecks, which are not limited to shortage of human resource for health sector but also hindering the rollout services to many sites as well as provision of high quality PMTCT services... The services provided are not always family centered as reproductive and child health services are not male friendly because immunization and HIV EID services are offered differently thus leading to an increased loss to follow up (HDT/CEPA Report, September 2009).

2.2 Early HIV testing (EID) in infants and young children

Early Infant Diagnosis of HIV infection provides an opportunity for identification of HEI, DBS collection, growth monitoring and development, provision of co-trimoxazole to prevent opportunistic infections (OI), proper feeding options, final HIV status determination and referral to care and treatment of HIV infected infants and young children.

Availability and proper implementation of EID provides opportunity to determine HIV infection, referral widespread pediatric health services, availability of drugs for opportunistic infections and early initiation of ART for HIV-infected infants and young

children. The early initiation of ART in HIV-infected children by 3 months of age reduces morbidity and mortality by 76% and 75%, respectively (Meyer-Rath G, IAS 2010). Access to PCR technique for EID of HIV in most resource-constrained countries has been made possible through donor funds in collaboration with governments including the United Republic of Tanzania. The initial global focus for HIV epidemic was centered on the coverage of PMTCT and scale up of HIV and AIDS care and treatment programs (HIV research group , February 6, 2006; Denver, co) led to the late diagnosis of HIV in young children at 18 months of age .

EID of HIV offers benefit to infant by determining the HIV status early and provide opportunity for early initiation of ART which would ultimately improve the quality of life through reduction of HIV related morbidity and mortalities. EID of HIV also assesses the effectiveness of PMTCT interventions and improves the morale of PMTCT health providers once HIV infections have been detected among exposed infants (Ciaranello et al, 2011). Once the final HIV status has been determined, the infant may be discontinued from opportunistic infection and postnatal ARV prophylaxis with reduction of resistance to these medication and cost related to medication. Through EID of HIV, parents may receive informed infant feeding options to further prevention of negative infants from mixed feeding.

2.3 Proportion of HIV testing in infants and young children

Despite its recent availability in resources-limited setting EID services uptake have faced many challenges contributed by several factors. Only 6% of HIV-exposed infants in developing countries received testing within two months of birth in 2009 (WHO/UNAIDS/UNICEF ,2010). If there is no systematic follow up and plan for early testing at 6 weeks, about 85% of HIV-exposed infants are lost (UNICEF, 2010). Lost to follow up of HIV-exposed infants during cascade of EID is contributed by poor linkage of PMTCT program after delivery, lack of coordination between reproductive and child health clinic, outpatients, inpatients wards and maternity wards have led to fewer infants identification and testing. Some other clinics focus on infants of known maternal HIV status while missing the opportunity to test those whose mother's status are unknown.

In Tanzania 87% of exposed infants were tested during pilot phase after been identified using maternal HIV status and positive antibody test (Nuwagaba et al,2010). In Kenya the study conducted showed that testing among HIV exposed infants at the health facility was 67% (Hassan et al, 2011)

2.4 Psychosocial factors contributing to the HIV testing in infants and young children

Poor HIV disclosure among partners, non-maternal caregivers have been linked to underutilization of EID as awareness of infants exposure status may not be known hence lack opportunity to serve these kids (Ciaranello et al, 2011). If there is no HIV disclosure to fathers and caregivers other than mothers, this can lead to poor understanding of the importance of follow up of HIV exposed infants for EID.

Parents may be reluctant to take their child for an HIV test for fear that the child will face discrimination once diagnosed. A lack of knowledge about testing can lead to poor testing rates. Mother who has not yet been tested may be fearful to know her child is infected as it would mean she is likely HIV-infected (UNICEF/WHO ,November 2008)

It has been reported that post-partum follow-up care and testing for HIV-exposed infants have been considered in existing RCH systems including essential immunization and growth-monitoring clinics which are well covered in many resource-constrained countries like Tanzania and provide a good opportunity for provision of prophylactic cotrimoxazole, HIV testing, and referral for other services (Creek et al, 2007). The majority of infants and young children are brought to the immunization clinics on a regular basis, however, follow up of exposed infants and the mothers has been challenging (Mahomva et al). It is necessary to integrate follow up of HIV exposed infants in routine RCH services and to ensure all pregnant women attend PMTCT services and their HIV status be determined. Documentation of each child's HIV exposure status in immunization and growth records is an essential step in expanding access to EID of HIV (Creek et al, 2007).

Maternal status is determined by ensuring HIV testing to pregnant mothers or mothers who had no HIV test during pregnancy, the status is then recorded in the antenatal clinic (ANC) card and later transferred to RCH immunization card. When an infant is brought to the clinic the health care providers look for HIV status in child's immunization card and link

the exposed infants for HIV testing. If the child is brought by a person other than mother and the status of exposure is unknown, the health care provider may take blood for antibody test. If the test would be reactive the child has passively acquired maternal antibodies, thus would be at risk for HIV infections and will be linked to HIV testing services (Report of a pediatric HIV Care and treatment assessment in the Kilimanjaro, Iringa and Mbeya regions of Tanzania, 2006).

2.5 Socio-demographic factors and HIV testing in infants and young children

Reality of early determination of HIV is lost when clients have poor mobility, travelling long distances and high cost of transport to the follow up clinic (McCoy et al, 2002). Health facilities that provide testing may not be accessible and ending up losing contact with HIV-exposed children for follow-up tests. (UNICEF/WHO 2008, November).

High unemployment rate and poor paternal support may deny mother for necessary resources to attend clinic visits (Jones et al, 2005). Due to unemployment clients may not have ability to pay for transport costs, which could be covered by male counterpart.

Ability to read and formal education increase more access to information and knowledge with increased utilization of services while more engagement in agricultural activities especially poor communities may have less access to education and hence poor health seeking behavior. In Malawi, less educated mothers and those from farming communities are less likely to attend HEI follow up clinic for EID of HIV (Ioannidis et al,1999).

Independent source of maternal income, larger household size, greater distance, and mothers on ART influence follow-up for EID (Cook et al,2011). Maternal lost to follow up, younger maternal age, poverty, lack of social support and inadequate training to health care providers are associated with poor access to EID services (Hassan et al,2011).

2.6 Health system factors and HIV testing for infants and young children

Health care system must provide necessary support in the cascade of HIV early infant diagnosis. A well defined system of mother-infant pair follow up including using of immunization cards to identify HIV status, availability of national guidelines , trained health care providers and supervised and provided with tools will ensure that HIV-exposed or infected children are identified and enrolled into care. (Cherutich et al,2008).

Health authorities' lack of technical ability, poor systems for laboratory analysis, troubles with transportation of specimens and results, and little confidence in caring for children are all contributing factors for low HIV testing among exposed infants (UNICEF/WHO (2008, November)

Many countries including Tanzania have modified children immunization cards with HIV exposure status codes. In some areas despite the fact that the Tanzanian Ministry of Health and Social Welfare has introduced codes for identifying exposed infants, documentation of maternal HIV status is not marked in mother ANC card and maternal HIV status is not transferred to baby's card. This is a real lost opportunity for identifying HIV-infected infants since immunization coverage in Tanzania is high (Report of a pediatric HIV Care and treatment assessment in the Kilimanjaro, Iringa and Mbeya regions of Tanzania,2006).

Testing of all sick infants admitted and improving use of immunization cards with maternal HIV status improves identification of exposed infants and linkage to HIV diagnosis.

Availability of test kits and testing all women attending antenatal clinics ensures identification exposed infants, more over regular availability of EID test kits and commodities will make all eligible infants who come to the clinic to have an HIV test. A well system of DBS and results sample transportation reduces the turnaround (TAT) time for results and hence timely availability of HIV DNA PCR results. Delay of results makes mother infant pair defaults from follow up clinic. Availability of new technology of short message services (SMS) printer has now being implemented in different resource-constrained countries including Tanzania will improve result delivery within short time.

The majority of trained health care providers are working in secondary and tertiary level health facilities, thus the referral system from primary level is challenging due to high

travel costs and sometimes means of referral is a verbal one (HDT/ CEPA Report, September 2009). Shortage of staff, inadequate skills and knowledge, inappropriate perception and overwhelmed are human resource factors which affect provision of health services. These will be manifested as poor motivation and regular absenteeism. Health care providers should be motivated by formal trainings, mentorship and regular supportive supervision. Furthermore availability of drugs, medical supplies, and support from higher authorities enhances morale to work and hence ensuring uninterrupted EID services.

Success of EID in any settings depends on the extent that the health system, healthcare providers, the clients and respective communities support its implementation. In Uganda significant efforts in training have reduced the average age at testing across all sites from 7.4 months to 6.1 months within 2 years (Kiyaga et al, 2010) This is a good example of how health systems can provide enough and adequate space for service provision, adequate and regular supply of equipments, a functional sample transportation system, high quality PCR laboratory and very well trained human resources.

Health care workers must adapt with increased demand on the time, acquire and sustain EID skills and knowledge while maintaining optimal attitudes and practice towards caring of HIV exposed infants. EID of HIV is integrated in PMTCT settings and its rollout is still ongoing in both urban and rural areas of Tanzania. It is important to sustain health workers performance reflected by knowledge acquired, attitudes and practices and accommodation of increasing workload. Provision of adequate education and counseling to all pregnant women on importance of EID is important and health care system should be improved to support implementation of EID avoiding unnecessary service interruptions.

CHAPTER THREE: METHODOLOGY

3.1 Study design

A cross sectional study was conducted in Bagamoyo and Kibaha districts in Coast region of Tanzania in 2012. This study was able to determine the prevalence of HIV among studied exposed infants and young children but also determine factors which were associated with utilization of EID for HIV infection.

3.2 Study area

3.2.1 Geographical location

Coast region is on the Eastern part of Tanzania mainland and a large part of the region is situated along the Indian Ocean coastal belt. The region is located between latitudes 60 and 80 South of Equator and between longitudes 370 30' and 400 East of Greenwich. The region shares borders with four regions including Tanga in the North, Morogoro in the West, Lindi in the South and Dar es Salaam in the Eastern side. In terms of distance, the region is near to Dar es Salaam city. As such, it is accessible to market of any product. Moreover, the region could get raw materials from neighbouring regions and these are important factors on economic improvement.

3.2.2 Surface Area

The total surface area of Coast region is 33,539 km2. Of these, 32,407 (96.6%) km^2 is land area while 1,132 (3.4%) km^2 is water surface. Coast region surface area is about 3.7% of Tanzania mainland. Rufiji is the largest district that covers 39.8% of total regional area. The second is Bagamoyo district with 9.3% of the total regional area while Mafia district is the smallest with only 1.5% of the total regional area. Rufiji and Bagamoyo districts are potential for agro-production while Bagamoyo, Rufiji and Mafia districts are rich in fishing economy. Similarly, Mkuranga and Kisarawe districts are potential for fishing industry while Kibaha district lacks water bodies for fishing activities.

3.2.3 Administrative Units

Coast region is made up of 6 districts and is composed of 7 councils. The additional council is Kibaha Town. The region contains 25 divisions. However, Bagamoyo and Rufiji districts lead with many divisions (6 each) while Mafia has least number of divisions (2 divisions). The region is sub-divided into 419 villages and 42 streets 101 villages or

24.1% of total regional villages are in Mkuranga. Rufiji district has 98 villages or 23.4%, Bagamoyo district with 19.6 % and Mafia district with 4.4% of total regional numbers. It is the expectation of the Government that established administrative units are used for keeping peace, order and promoting economic activities through good governance. Good governance involves rule of law, transparency, human justice, democracy and effective participation.

3.2.4 Population description

Population census results of 2002 showed that coast region had a total population of 885,017. In Tanzania mainland, such results rank Coast region at number 20 out of 21 regions in the year 2002. This ranking increases negatively from previous census as compared with other regions possibly due to high infant mortality rates and low birth rates. But high rate of rural-urban emigration to Dar es Salaam city is also another contributing factor. High proportion of the region population lives in Bagamoyo district followed by Rufiji district. A lot of economic activities are more viable in Bagamoyo, Rufiji, Mkuranga and Kibaha districts than in Mafia

3.2.5 Health sector information

3.2.5. 1 Common Causes of Morbidity

In 2005, Malaria, ARI and Pneumonia were the 1st, 2nd and 3rd in causing morbidity, respectively (Coast Region Commissioner's Office, Kibaha, 2006). ARI affected more Mkuranga district residents while malaria was prevalent in Bagamoyo District and Diarrhoea more acute in the same District than others. These causes of morbidity in Rufiji district are more minimal than other districts.

3.2.5.2 Ten Common Causes of Mortality

Main cause of mortality in the Coast region for the year 2005 was malaria than other diseases. In the year 2005, second threat in Bagamoyo district was TB, Kibaha district was HIV/AIDS, Rufiji district was anaemia while Mafia district was HIV/AIDS.

3.2.5.3 HIV/AIDS

HIV/AIDS is a killer disease in all the regions including Coast. In 2005 number of cases was increasing in all districts but the rate was higher in Mkuranga district than other districts . The second area with high cases was Kisarawe district. However, the cases were more serious in Kibaha district between 2004 and 2005. Mafia district had lesser cases of

HIV/AIDS than other districts. Mafia district being an Island could be among the influencing factor of having minimal number of HIV/AIDS.

3.2.5.4 Distribution and ownership of health facilities

Coast region gets health services from hospitals, health centres and dispensaries. A total of 8 hospitals operate in the region (Coast Region Commissioner's Office, Kibaha, 2006). Out of them, large numbers (87.5%) are public owned where Rufiji district owns 2 hospitals, one public and the other one being private. Coast region habitants get health services from 18 health centres. A big proportion (88.9%) of them is owned by public where Rufiji district alone owns 5 (27.8) of the total regional health centres. However, Mafia district does not possess any health centre. Two hundred and three dispensaries are operating in the region. Of these, 154 (75.9%) are owned by public with Rufiji district owning 55 (27.1%) of the total regional dispensaries. Mafia district owns 14 (6.9%) which are fewer than other districts (Coast Region Commissioner's Office, Kibaha, 2006)

3.3 Study population

Study population included 238 HIV-exposed infants and children aged between 4 weeks and 18 months born live to HIV-infected mothers that received PMTCT services and attending immunization clinics at 5 health facilities in Coast region.

3.4 Sample size

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

n= sample size

z= point on standard distribution

p= proportion of infants with HIV infection (17%, from the pilot study in Tanzania, Nuwagaba et al 2010)

ε = margin of error on estimate

$$n = \frac{1.96 \times 1.96 \times 17(100-17)}{5^2} = \frac{3.84 \times 17 \times 83}{25}$$

n= 217 + 10% of non-respondents = **217 + 22 = 239**

3.5 Sampling Procedure

Two districts (Bagamoyo and Kibaha) in Coast region were conveniently selected. A regional hospital, 1 District hospital and 3 health centers were selected based on the fact that they had implemented EID services for more than 3 years and have many clients. The facilities selected were Tumbi regional hospital, Mkoani health centre, Mlandizi health centre, Bagamoyo district hospital and Chalinze health centre. A total of 5 health facilities were included in the study. Every HIV exposed child aged between 4 weeks up to 18 months who brought to the health facility for under-five clinic, outpatient ward, inpatient wards and whose parent/ guardian consented conveniently had equal chance of being involved in the study.

3.6 Data collection

The developed tools (Questionnaire and checklist) were reviewed by supervisor and investigator,. were piloted to few infants/children and satisfied with questions which prompted the responses expected for the study. Data was collected using the following methods:-

3.6.1 Structured interview

HIV-exposed infants brought to the RCH clinic for immunization and growth monitoring were identified by checking their exposure status in their immunization cards. All mothers of HIV exposed infants who consented for the study were interviewed using a standardized questionnaire. Information collected includes socio-demographic and psychosocial characteristics of the interviewee, PMTCT services received during ANC visits and knowledge on testing for EID HIV infection.

3.6.2 HIV testing data for infants and young children

Data from PMTCT mother/child follow up registers for HIV were collected and used to cross check the HIV results for exposed infants, and the proportion of HIV testing from total HIV exposed infants was identified at the RCH clinic during the study period. The magnitude of HIV infection among HIV-exposed infants was estimated out of all infants who received testing. Mother's CTC cards were used to assess mothers who have been enrolled to the HIV care and treatment programs.

3.6.3 Checklist

A developed checklist was used to assess the health facility factors that influence utilization of EID for HIV infection.

3.7 Data management and analysis

The investigator assisted by five research assistants collected the data. Following data collection, the investigator cross checked the filled data collections forms to ensure completeness and accuracy. The data were entered into the Epidata version 3.1 program. Data cleaning was done and exported to Stata software for statistical analysis. Using stata version 12.1, the proportions (categorical variables), means and medians (continuous variables) were computed. The association between EID HIV testing and other factors was assessed using chi-square and fishers exact test for categorical variables and t-test for continuous variables. Further analyses to determine the predictors of EID HIV testing was done using univariate and multivariate logistic regressions. P-value of less than 0.05 was considered as statistically significant.

3.8 Variables

HIV testing was a dependent variable while maternal age, paternal support, stigma, knowledge, attitude, level of education, disclosure for HIV status, infant cared by guardian, distance from health facility, mother in enrolled in care and treatment trained HCW, HEI identification system, availability of EID materials, HIV support groups, sample and results transportation system, are influential/hindrance independent variables of the study.

3.9 Ethical considerations

Ethical approval was obtained from MUHAS Senate and Research Publication Committee. A written consent was obtained from the parents/guardians of each infant upon understanding the purpose of the study.. Participation in the study was voluntarily and parent /caregiver who consented to participate in the study had to sign the consent form. Permission to collect data was granted by Regional Administrative Secretary (RAS) and District Executive Directors (DED) from respective districts in the Coast region.

CHAPTER FOUR: RESULTS

Early infant diagnosis of HIV is one of the most important challenges in the management of pediatric HIV infection in resource constrained settings. This study involves a cohort of HIV exposed infants designed to determine different factors which associated with utilization of EID for HIV.

4.1 Baseline characteristics of HIV exposed infants studied.

A total of 238 parents/guardian of the HIV-exposed infants were recruited from 5 health care facilities in Coast region. Table 4.1 summarizes baseline characteristics of HIV-exposed infants identified in Coast region. Among all HIV exposed infant, 136 (57%) were males. The magnitude of HIV testing among HIV-exposed infants was 87%. Exclusive breast feeding was the most common reported mode of infant feeding. One hundred and forty three (70%) of tested HIV-exposed infants/children were reported to have received their DBS HIV DNA PCR results. The prevalence of HIV infection among HIV-exposed infants who underwent testing was 13%

Table 4.1 Baseline characteristics of HIV exposed infants and young children studied in Coast region (N=238)

Characteristics	Category	N	%
Sex	Male	136	57.1
	Female	102	42.9
HIV testing	YES	207	87
	NO	31	13
Co -trimoxazole prophylaxis*	YES	170	78
(n=218)	NO	48	22
Mode of infant feeding	Exclusive BF	183	77
	Replacement feeding	27	11
	Mixed feeding	28	12
Received HIV test results**	YES	143	70
(n=207)	NO	64	30
HIV test results***	Positive	18	12.6
(n= 143)	Negative	125	87.4

4.2 Caregiver description in relation to HIV exposed infants and young children

Table 4.2 Describes the caregiver in relation to HIV exposed infants identified in Coast region. Of 238 caregivers, 235 (99%) were mothers of HIV exposed infants, 137 (58%) of all respondents had completed primary school education, 158 (66%) were unemployed while 125 (53%) had formal marriage. Many participants, 166 (70%), live within 10 kilometers of health facility, disclosure of HIV status to relative and partner was high (85%) and the majority of women, 90%, were enrolled to the care and treatment clinic. Linkage to supporting groups for people living with HIV and AIDS was 65 (27%).

Table 4. 2 Description of the caregiver in relation to HIV exposed infants and young children identified in Coast region (N=238)

Characteristics	Category	N	(%)
Relationship between care	Mother	235	98.7
giver and exposed child	Father	1	0.4
	Guardian	2	0.8
Education	No formal education	41	17.4
	Primary incomplete	38	16.1
	Primary complete	137	58.1
	Secondary	20	8.5
Occupation	Employed	80	33.6
	Unemployed	158	66.4
Marital status	Single	62	26.1
	Married	125	52.5
	Cohabiting	51	21.4
Distance from health facility	Within 10 kilometers	166	69.8
	Above 10 kilometers	72	30.2
Disclosure HIV status*	Husband	112	48
(n=235)	Mother/ other relative	90	38
	None	33	14
CTC enrollment of mother*	Enrolled	212	90
(n= 235)	Not enrolled	23	10

Table 4.3 continues: Description of the caregiver in relation to HIV exposed infants and young children identified in Coast region (N=238)

Characteristics	Category	N	(%
Attached to PLWHA groups* (n=235)	Community	10	4.3
	Psychosocial group	55	23.4
	None	170	72.3
Care givers by health facility	Bagamoyo Hospital	34	14.3
	Chalinze HC	35	14.7
	Mkoani HC	36	15.1
	Mlandizi HC	53	22.3
	Tumbi Hospital	80	33.6

**Variable was specific to mothers of HIV exposed infants and young children among all caregivers.*

4.3 Testing of HIV exposed infants and young children in relation to socio-demographic factors.

Table 4.3 summarizes testing of HIV-exposed infants by the socio-demographic characteristics. The mean age of care givers was 31 years, an average of each caregiver has 3 children, and the average family size consists of 5 people. The average age of HIV testing among exposed infants was 1.9 months. HIV testing during pregnancy (p=0.01), PMTCT intervention to mother (p<0.01), frequency of attending EID clinic (p<0.01*) and number of children a caregiver has (p< 0.05) were significantly associated with testing of HIV-exposed infants.

Table 4.4 Testing of HIV exposed infants and young children in relation to socio-demographic factors (N=238)

Factor	Category	HIV testing of infant		P value
		YES n (%)	NO n (%)	
Level of education of a caregiver	No formal education	32 (78.1)	9 (22)	
	Primary education incomplete	33 (86.8)	5 (13.2)	
	Primary education complete	123 (89.8)	14 (10.2)	
	Secondary education	18 (90)	2 (10)	0.26
Marital status	Single	52 (83.9)	10 (16.1)	
	Married	111 (88.8)	14 (11.2)	
	Cohabiting	44 (86.3)	7 (13.7)	0.63
Distance from health care facility	Within 10 km	145 (87.4)	21 (12.6)	
	Above 10 km	62 (86.1)	10 (13.9)	0.8
Mother's HIV testing period	Before pregnancy	77 (92.8)	6 (7.2)	
	During pregnancy	117 (87.3)	17(12.7)	0.01
	After pregnancy	13 (61.9)	8 (38.1)	

Table 4.3 continues: Testing of HIV-exposed infants in relation to socio-demographic characteristics (N=238)

Factor	Category	HIV testing of infant		P-value
		YES	NO	
		N (%)	(%)	
PMTCT intervention to mother	Single dose NVP	38(90.5)	4(9.5)	
	Triple drugs prophylaxis	123 (91.1)	12(8.9)	
	ART	27 (90)	3(10)	
	None	19 (61.3)	12(38.7)	<0.01
Frequency of attending EID clinic (n= 186)***	Monthly	151 (98.7)	2(1.)	<0.01*
	After 2 months	8 (100)	0(0)	
	None	12 (48)	13(52)	
Child on CTX prophylaxis**** (n= 218)	Receive	167 (98.2)	3(1.8)	<0.01
	Not receive	28 (58.3)	20 (41.7)	
Occupation	Employed	69 (86.3)	11(13.7)	
	Unemployed	138 (87.3)	20 (12.)	0.81
Age of caregiver		207	31	0.40
	Mean (years)	30.8 SD** (6.4)	30.5 SD**(5)	
Number of caregiver's children		207	31	
	Mean (number)	2.7 SD** (1.2)	3.1 SD**(1.6)	<0.05
Number of family members		207	31	
	Mean (number)	4.9 SD **(1.7)	5.4SD** (2.3)	0.09
Infants' age at testing		206	1	-
	Mean (months)	1.9 SD** (1.4)	4 SD** (4)	

** Fishers exact test SD** Standard deviation*
****Some HIV exposed infants and young children were seen at EID clinic for the first time*
***** Some infants and young children were not initiated on co-trimoxazole.*

4.4 Testing of HIV exposed infants and young children in relation to psychosocial factors.

Table 4.4 summarizes testing of HIV-exposed infants by the psychosocial factors. Disclosure of HIV status (p=0.01) and enrollment to CTC (p=0.02) are significantly associated with HIV testing in exposed infant.

Table 4. 5 Testing of HIV exposed infants in relation to psychosocial factors (N=238)

Factor	Category	HIV testing of infant		P-value
		YES n (%)	NO n (%)	
Relationship between caregiver and HIV-exposed infant	Mother	204 (86.8)	31 (13.2)	
	Father	1 (100)	0	
	Guardian	2 (100)	0	
	None	19 (61.3)	12(38.7)	1.00*
Mother HIV status disclosure** (n=235)	Husband	104(92.9)	8(7.1)	0.01
	Mother/relative	76 (84.4)	14 (15.6)	
	None	26 (79)	7 (21)	
Mothers CTC enrollment** (n= 235)	Enrolled	188(88.7)	24(11.3)	0.02
	Not enrolled	18 (78.2)	5(21.8)	

* ***Fishers exact test***

** ***The variable consists of only mothers of HIV exposed infants and young children among all caregivers***

4.5 Utilization of EID for HIV in exposed infants and young children in relation to the health care facility factors.

Table 4.5 summarizes health care facility factors in relation to utilization of EID of HIV infection. All facilities had availability of commodities for EID of HIV, trained human resources, system of identification of HIV-exposed infants. Four out of 5 (80%) facilities had job aids and RCH cards available for documentation of HIV exposure status. Three out of 5 facilities (60%) had proper documentation of DBS results and a clear system of sample transportation. Female to male ratio of EID trained health care providers was found to be 3:1. Approximately 3 health care providers at each facility were found to provide the services. All facilities reported to offer EID services for 5 days in a week. In the past 3 months one facility experienced a stock out of RCH 4 cards for identifying HIV exposure status of infants.

Table 4.6 Utilization of EID for HIV in exposed infants and young children in relation to the health care facility factors

Health facility factor	Yes (N)	%
EID services available	5	100
Facilities trained HCWs	5	100
Facilities which have RCH cards	4	80
HCWs at the registration desk have knowledge on EID services	5	100
HCWs at the registration desk check for HIV exposure status	5	100
Exposure status recorded in the RCH 1 cards	5	100
Facilities with availability of EID job aids , DBS kits and co-trimoxazole	5	100
Job aids in use	4	80
Facilities with regular refill of DBS materials and had no stock out of DBS past 3 months	5	100
Facilities which has proper documentation of DBS results	3	60

Table 4.5 continues: Utilization of EID for HIV in exposed infants and young children in relation to the health care facility factors

Health facility factor	Yes (N)	%
Facilities with sample transportation system in place	3	60
Facilities whereby DBS sample is transported in a weekly basis	3	60
Facilities where parents/ guardian are advised when to come for results	5	100
Facilities where there is any psychosocial support group for PLWHA especially infected mothers	5	100
Facilities with 5 clinic days per week	5	100

RCH = Reproductive and child health, DBS = Dried blood spots

4.6 Univariate and multivariate analysis for factors associated with HIV testing among HIV exposed infants and young children.

Table 4.6 summarizes univariate and multivariate logistic regression analyses of factors associated with testing of HIV-exposed infants. In univariate analysis, early HIV testing during pregnancy, PMTCT ARV prophylaxis, disclosure of HIV status, enrollment to CTC, frequent attendance to EID services, co-trimoxazole prophylaxis and exclusive breast feeding were found to be significant predictors for testing of HIV-exposed infants. In multivariate analysis, monthly attendance to HIV EID clinic was independent significant predictor (AOR 2100, 95% CI 3.3 -1314904, $p<0.05$) for testing of HIV-exposed infants.

Table 4. 7 Univariate and multivariate logistic regression analyses of factors associated with testing of HIV exposed infants and young children in Coast region. (N=238)

Factor	Category	% testing	Univariate regression		Multivariate regression	
			Crude OR (COR)	95% CI	Adjusted OR (AOR)	95% CI
Mother's HIV testing period	After pregnancy	8.8%	1.0		1.0	
	During pregnancy	56.3%	3.4	1.3 - 9.0	1.0	0.0 -2255.8
	Before pregnancy	34.9%	2.3	0.8 - 6.1	114.5	0.0 - 1.0
PMTCT intervention to mother	None	13.0%	1.0		1.0	
	ART	12.6%	5.7	1.4 - 22.9	0.001	2.6 - 15.6
	Triple ARV prophylaxis	56.7%	6.5	2.5 - 16.5	0.004	9.0- 158.3
	Single dose NVP	17.7 %	6	1.7 -21.1	2.8	0.0-1437.6

Table 4. 6 continues: Univariate and multivariate logistic regression analyses of factors associated with testing of HIV-exposed infants in Coast region.(N=238)

Factor	Category	% testing	Univariate regression Crude OR (COR)	95%CI	Multivariate regression Adjusted OR (AOR)	95% CI
Mother HIV status disclosure	None	14.7%	1.0		1.0	
	Mother /relative	38%	1.9	0.7- 4.9	3.5	0.0 -283.8
	Husband	47.3%	4.5	1.6 -12.8	25.7	0.1 -3626.2
Mother's CTC enrollment* (n=235)	Not enrolled	89.5%	1.0		1.0	
	Enrolled	10.5%	3.0	1.2- 8.0	4.8	0.04 - 527.0
Frequency of attending EID clinic** (n=186)	None	82.3%	1.0		1.0	
	After 2 months	4.3%	1		1	
	Monthly	13.4%	81.8	16.5-405.3	2100.6	3.3 – 1314904
Child on co-trimoxazole (n = 218)***	Not receive	22.0%	1.0		1.0	
	Receive	78.0%	39.8	11.1-142.7	2.1	0.1 - 89.3
Mode of infant feeding	Mixed	12.0%	1.0		1.0	
	Replacement	11.0%	1		1	
	Exclusive breast feeding	77.0%	3.4	1.4 - 8.5	7.9	0.03 -1842.3

* ***The variable consists of only mothers of HIV exposed infants and young children among all caregivers***

***** Some HIV exposed infants and young children were seen at EID clinic for the first time***

****** Some infants and young children were not initiated on co-trimoxazole***

CHAPTER FIVE: DISCUSSION

5.1 Introduction

EID of HIV infection is the most important source of linkage in pediatric HIV management. The current study aimed to determine the magnitude of HIV testing and infection, and factors associated with utilization of EID using the available DBS HIV-1 DNA PCR method among HIV-exposed infants in our resource limited settings.

5.2 Baseline characteristics of the study population

The study findings showed that about 99% of HIV-exposed infants were brought to the health care facility by their mothers, whose disclosure of their HIV status were 85% and enrollment in to care and treatment services (CTC) were 90%. The enrollment is contrary to Mozambique findings where by 49% of the women were enrolled to CTC (Cook et al 2011) The findings in Coast Tanzania can be explained by increased coverage of HIV care and treatment services, with availability of HIV interventions like counseling and ART. These have contributed to the reduction of HIV related maternal deaths. Furthermore, HIV awareness among people could explain the improved mother's HIV disclosure status.

5.3 Proportion of HIV testing in infants and young children

In the current study, 87% of HIV-exposed infants among all attending health care facilities were tested. The study findings were in agreement with what was reported previously in Tanzania (Nuwagaba et al 2010) which was 87% but higher to 67% reported in Kenya (Hassan et al 2011). Integration of EID in RCH settings and counseling by healthcare providers may explain the high utilization in Tanzania. However, 13% who had no access to HIV EID services pose the challenge of follow up of HIV-exposed infants as reported previously in Zimbabwe (Mahomva et al 2009). More efforts are needed to maximize identification and testing of HIV-exposed infants by linking EID of HIV infection testing with other potential entry points like outpatient clinics, pediatrics ward and Tb/HIV clinics.

The current national algorithm for EID of HIV infection recommends testing of HIV-exposed infants at the age of 4-6 weeks or any time thereafter (National EID guideline for Tanzania October 2008). In the current study the median age of HIV testing was 1 month (4 weeks). These findings are in contrast with those reported previously from other studies

in which 5, 4, 1.5 months were observed in Mozambique (Cook et al 2011), Tanzania (Nuwagaba et al 2010) and in Cameroon (Tejiokem et al 2011), respectively. The earlier age of EID testing found in the current study might have been contributed by more sensitization through client counseling, health talk in health facility, increased awareness on EID of HIV infection and availability of commodities for DBS collection and clearance of backlog of untested infants since establishment of these services in 2006.

5.4 Prevalence of HIV infection among HIV exposed infants

The finding that overall 13% of HIV-exposed infants tested positive using HIV-1 DNA PCR test on their first test is comparable with 17% documented previous in Tanzania (Nuwagaba et al 2010) and 16% in Mozambique (Cook et al 2011) Rapid scale up of PMTCT services, wide coverage of PMTCT intervention with phased out of less efficacious single dose NVP, introduction of more efficacious PMTCT regimen and ART could have contributed to the decrease in HIV positivity rate among HIV-exposed infants. However, more effort should be considered by endorsing global approaches towards elimination of mother to child transmission of HIV as targeted to be below 5% (Ciaranello et al 2011). The strategies involve maximizing PMTCT coverage to remote areas, availability of commodities for HIV testing in mothers and children, enhancement of skills for health care providers and effective initial and continuous utilization of HIV services. Furthermore, prioritization of maternal ART reduces risk of HIV transmission to exposed infants.

5.5 Factors associated with HIV testing among HIV exposed infants

The study investigated some factors which were associated with HIV testing among exposed infants. In univariate analysis early HIV diagnosis during pregnancy ($p<0.01$), presence of PMTCT prophylaxis ($p<0.05$), cotrimoxazole prophylaxis in exposed infants $p<0.01$, disclosure of HIV status to partner and mother enrollment to care and treatment clinic ($p<0.05$) were significantly associated with EID for HIV. In this study, a multivariate analysis showed that only frequency of EID was significantly and independently predictor of utilization of EID for HIV.

5.6 Study strengths and limitations

One of the strengths of the current study was that it was conducted in 5 health care facilities with different recruitments and working practices (hospitals and health centre) within a decentralized health care system in Tanzania. Thus, the study reflects the diversity of practical management of EID of HIV infection in a diverse population living in suburban areas.

The current study has some limitations which are the fact that it was carried in a health facility level and included participants who returned to the clinic for services may not be a representative sample of those who are potentially in the community and had no opportunity to reach the health care facility for services. Furthermore self reporting is a limitation since the information which has been provided could not be counterchecked for its reliability.

The wide 95% confidence interval and low statistical power in multivariate analysis could be explained by too few events observed. However, the sample size was computed based on the prevalence from previous study within the country.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

High utilization of EID and decreased prevalence of HIV infection coupled with availability of commodities for identifying and testing, skilled health care providers and PMTCT services coverage with availability of more efficacious drugs were found among Tanzanian HIV-exposed infants. Monthly attendance to HIV EID clinic predicted significantly the testing among HIV-exposed infants.

6.2 Recommendations

The Tanzania government should focus on implementation of global plans for elimination of Mother to child HIV transmission (e-MTCT) through strengthening of the existing system and collaborate with different partners and stakeholders in order to scale up EID services to all levels of health facilities.

The Ministry of Health should strengthen the current health system to ensure uninterrupted supply chain of DBS materials, RCH cards, availability and use of job aides and proper service documentation.

Lastly, efforts should be directed to the community to raise awareness of early HIV testing during pregnancy, appropriate initiation of PMTCT intervention, make earlier EID of HIV infection and monthly follow up of HIV-exposed infants for growth monitoring, infant feeding, cotrimoxazole prophylaxis and results.

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8.0 APPENDICES

8.1 APPENDIX 1: INFORMED CONSENT (ENGLISH VERSION)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES (MUHAS)

DIRECTORATE OF RESEARCH AND PUBLICATIONS

Dear participant,

I would like to tell you about the research study I am doing. The research study is a way of learning about something.

I would like to find out more about utilization of HIV testing among children born to HIV infected mothers and related factors which may facilitate or hinder them to receive HIV test and related follow up services.

You are being asked consent for your baby to join in this interview because she/he is born to HIV infected mother and the age of the baby is between 4 weeks and 18 months.

If you accept to be interviewed on behalf of your child, you will be asked several questions regarding HIV and services which you and/or your child receive.

This study will help to answer your questions regarding the HIV and link you and your baby to appropriate care if you have not done so. This will help you to benefit from HIV management. This study will help us to learn about utilization of HIV testing in children and recommendations on the best way of implementation will be presented to responsible authorities for improving the conditions.

You don't have to join the study. It is up to you. You may say YES or NO and no one will blame you or decline you from receiving your intended services.

Before you say YES or No to be interviewed, I will answer any question you have and if you join interview you can ask questions at any time. Just tell the interviewer you have a question.

Should there be any question on your right as a participant kindly contact Professor Muhsin Aboud, chairman of Muhimbili University Directorate of Research and Publication P.O.Box 65001 Dar es salaam or call 2150302

8.2 APPENDIX II: INFORMED CONSENT FORM (SWAHILI)

CHUO KIKUU CHA SAYANSI ZA AFYA NA KURUGENZI YA UTAFITI NA MACHAPISHO

Ndugu mshiriki,

Napenda kukuelezea kuhusu utafiti ninaoufanya. Utafiti ni njia ya kujifunza mambo fulani. Utafiti ninaofanya napenda kuangalia utumiaji wa huduma za kuchunguza hali ya maambukizi ya virusi vya UKIMWI kwa watoto waliozaliwa na akina mama walio na maambukizi ya virusi vya UKIMWI. Pia napenda kujua hamasa na vikwazo katika kuwapatia huduma ya upimaji na huduma nyinginezo wanazostahili kupata watoto hao.

Unaombwa kutoa ridhaa ili mwanao aweze kushirikiswa katika utafiti huu kwani amezaliwa na mama mwenye maambukizi ya virusi vya UKIMWI na pia umri wake ni kati ya wiki 4 na miezi 18.

Ikiwa utaridhia kushiriki kwenye utafiti, kwa niaba ya mwanao utaulizwa maswali mbalimbali kuhusu UKIMWI na huduma zinazohusiana na virusi vya UKIMWI ulizopata wewe na mwanao.

Utafaidika na utafiti huu kwa kuweza kupatiwa majibu ya maswali yahusuyo maambukizi ya virusi vya UKIMWI na pia kukusaidia kufanikisha wewe na mwanao kupata huduma sahihi iwapo hujazipata. Utafiti huu utasaidia kujua utumiaji wa huduma ya upimaji wa hali ya maambukizi ya virusi vya UKIMWI kwa watoto na mapendekezo ya njia bora za utekelezaji wa huduma hii yatafikishwa kwa mamlaka husika.

Uamuzi wa kujiunga na utafiti huu ni wako wala hushurutishwi kujiunga. Una ridhaa ya kukubali au kukataa kujiunga na utafiti huu wala hutalaumiwa au kunyimwa huduma nyingine kwa kutojiunga na utafiti.

Kabla ya kutoa jibu la maombi ya kushiriki utafiti huu iwapo una swali lolote waweza kuuliza au ukijiunga kwenye utafiti waweza kuuliza swali muda wowote.

Kama utakuwa na swali lolote kuhusu haki zako kama mshiriki tafadhali wasiliana na Profesa Muhsin Aboud, mwenyekiti wa Idara ya Utafiti ya Chuo Kikuu cha Muhimbili S.L.P 65001 Dar es salaam, namba ya simu 2150302-6

8.3 APPENDIX III: CONSENT AGREEMENT FORM (ENGLISH)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES (MUHAS)

DIRECTORATE OF RESEARCH AND PUBLICATION

I parent or legal guardian of …… has read the previous page of the consent form and the investigator has explained the details of the study. I parent or legal guardian understand that I am free to ask additional questions.

I parent or legal guardian understand that the research under way has no formal program for compensating clients for any hurt arising from this research. Medical treatment will be provided at the usual charge to me or to my insurer unless payment is otherwise provided for in this consent form.

I parent or legal guardian understand that the participation to this interview is voluntary and no any penalty, loss of benefit or prejudice a quality of care I will receive upon my refusal to join the study interview.

_____ _____

PARENT OR LEGAL GUARDIAN DATE SIGNATURE/ FINGER PRINT

TEL/MOBILE NUMBER

……..

DR JOHN G. GAMALIEL _____

INVESTIGATOR'S NAME DATE SIGNATURE OF INVESTIGATOR

TEL/MOBILE NUMBER +255754623486/ +255783503864

8.4 APPENDIX IV: CONSENT AGREEMENT FORM (SWAHILI)

CHUO KIKUU KISHIRIKI CHA SAYANSI NA TIBA MUHIMBILI (MUHAS)

IDARA YA UTAFITI

Mimi mzazi/ mlezi halali wa ……..nimesoma / nimesomewa maelezo ya ridhaa ya ushiriki kwenye utafiti ambayo pia mtafiti amenielezea kuhusu utafiti husika. Mimi mzazi/mlezi naelewa kwamba niko huru kuuliza maswali yeyote kuhusu utafiti huo.

Mimi mzazi/mlezi naelewa kwamba utafiti unaoendelea hauna mpango wowote wa fidia kwa wateja watakaopata athari zozote katika utafiti. Matibabu yatapatikana kwa kufuata mpango wa kawaida au kwa kutumia mfumo wa bima na wala si gharama zitokanazo na utafiti.

Mimi mzazi/mlezi naelewa kwamba ushiriki wangu kwenye mahojiano ya utafiti ni wa hiari na hakuna adhabu au kukosa huduma pindi nisipotoa ridhaa ya ushiriki au kujitoa kwenye mahajiano ya utafiti.

MZAZI/MLEZI TAREHE SAHIHI AU DOLE GUMBA

NAMBA YA SIMU ……..

JOHN.G.GAMALIEL

……

MTAFITI TAREHE SAHIHI YA MTAFITI

NAMBA YA SIMU +255754623486/+255783503864

8.5 APPENDIX V: QUESTIONNAIRE (ENGLISH VERSION)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES (MUHAS)

Utilization of the HIV early infant diagnosis and associated factors in Coast region, Tanzania:

1. Name of the facility ……
2. Level of the facility
    i. Hospital
    ii. Health centre
3. Ownership of the facility
    i. Government
    ii. Private
    iii. FBO
4. Relationship of next of kin to HEI
    i. Mother
    ii. Father
    iii. Guardian (specify……..
5. Age of mother/father/guardian ……..
6. Level of education of mother/father/guardian
    i. No formal education
    ii. Primary education not completed
    iii. Primary education completed
    iv. Secondary education
    v. College (Specify ……..
    vi. University……
7. Occupation of the mother/ father/ guardian……..
    i. Employed
    ii. Unemployed
    iii. Other (specify)……

8. Marital status of the mother
   i. Single
   ii. Married
   iii. Cohabiting
9. How many children do you have? ……
10. How many members are in your family? ……...
11. How far in kilometers from health facility do you stay
   i. Within 10 kilometers
   ii. More than 10 kilometers
12. When was mother known to be HIV infected? .....
   i. Before pregnancy
   ii. During pregnancy
   iii. After pregnancy
13. What PMTCT intervention did mother receive?
   i. Single dose nevirapine
   ii. Triple drugs (Lamivudine +AZT +NVP)
   iii. Antiretroviral treatment (ART)
   iv. None
14. To whom have you disclosed your HIV status
   i. Husband
   ii. Mother/ relative
   iii. None
15. Is mother enrolled to CTC?
   i. YES If YES write CTC number…….
   ii. NO
16. Which social groups of PLWHA are you attached to
   i. Community
   ii. Psychosocial support groups
   iii. None
17. Date of birth of infant ……/Current age……..

18. Sex of the infant
    i. Male
    ii. Female
19. What PMTCT intervention did infant receive?
    i. SdNVP
    ii. AZT
    iii. None
20. Mode of infant feeding
    i. Exclusive breast feeding for 6 months
    ii. Replacement feeding
    iii. Mixed feeding
21. Have you ever heard of HIV testing in infants?
    i. YES if YES continue with question 22
    ii. NO
22. When did you hear about HIV testing in infants
    i. Before pregnancy
    ii. During delivery
    iii. After delivery
23. Where did you hear
    i. Television/radio
    ii. Brochure/ magazine
    iii. Health facility staff
24. Did your infant receive HIV testing?
    i. YES If YES go to question 26
    ii. NO If NO go to question 28
25. Date of HIV testing……/Age at HIV testing ……
26. What makes you to test your baby?
    i. Counseling from HCWs
    ii. Eager to know results
    iii. Others (specify)…….

27. What makes you not to test your baby?
    i. Fear
    ii. I did not know about the test
    iii. Others (specify)…….
28. How often do you bring your child for RCH services?
    i. Every month
    ii. After every 2 months
    iii. Others (specify)
29. How often do you bring your child for EID services?
    i. Every month
    ii. After 2 months
    iii. Other……(specify)
    iv. None
30. Does your child receive Cotrimoxazole
    i. YES if YES go to question number 29
    ii. NO if NO go to question number 30
31. How often do you bring your child for Cotrimoxazole?

    ……

    ……
32. Have you received the HIV test result of the baby?
    i. YES If YES go question number 34
    ii. NO If NO go question 35
33. What is the HIV result results of your child
    i. POSITIVE
    ii. NEGATIVE
    iii. I do not know
34. Why have you not received HIV test results for your baby?
    i. Fear
    ii. Results delayed in previous visits
    iii. Long distance
    iv. Other (specify)…….

8.6 APPENDIX VI: QUESTIONNAIRE (SWAHILI VERSION)

CHUO KIKUU KISHIRIKI CHA SAYANSI NA TIBA MUHIMBILI (MUHAS)

Utilization of the HIV early infant diagnosis and associated factors in Coast region, Tanzania:

1. Jina la kituo …….
2. Ngazi ya kituo
    i. Hospitali
    ii. Kituo cha Afya
3. Miliki ya kituo
    i. Serikali
    ii. Binafsi
    iii. Shirika la dini
4. Uhusiano na mtoto
    i. Mama
    ii. Baba
    iii. Mlezi (elezea) ……..
5. Umri wa mama/baba/mlezi …….
6. Kiwango cha elimu ya mama/baba/mlezi
    i. Hajapata elimu
    ii. Hajamaliza elimu ya msingi
    iii. Amemaliza elimu ya msingi
    iv. Elimu ya sekondari
    v. Elimu ya chuo (Elezea)……
    vi. Elimu ya chuo kikuu
7. Kazi ya mama/baba/ mlezi
    i. Mwajiriwa
    ii. Hajaajiriwa
    iii. Nyingineyo (Elezea)……

8. Hali ya ndoa
    i. Hajaolewa/ hajaoa
    ii. Ameolewa/ameoa
    iii. Anaishi na mwanaume/mwanamke bila ndoa
9. Una watoto wangapi wanaoishi …….
10. Familia yako ina jumla ya watu wangapi? …….
11. Umbali kati ya unapoishi na kilipo kituo cha huduma ya afya
    i. Umbali wa chini ya kilometa 10
    ii. Umbali wa zaidi ya kilometa 10
12. Mama amegundulika na maambukizi ya virusi vya UKIMWI kipindi gani?
    i. Kabla ya ujauzito
    ii. Wakati wa ujauzito
    iii. Baada ya ujauzito
13. Dawa zipi za kuzuia maambukizi ya virusi vya UKIMWI kwenda kwa mtoto ulizopata?
    i. Nevirapine pekee
    ii. Dawa tatu za Zidovudine, Lamivudine na Nevirapine
    iii. Dawa za kuzuia makali ya virusi vya UKIMWI
    iv. Hakuna dawa niliyotumia
14. Umemwelezea nani hali yako ya maambukizi ya virusi vya UKIMWI
    i. Mume
    ii. Mama/ ndugu/ rafiki
    iii. Sijamweleza mtu yeyote
15. Mama amejiunga na kliniki ya huduma na tiba ya UKIMWI
    i. Ndiyo kama ndiyo andika CTC namba ……..
    ii. Hapana
16. Vikundi vipi vya wanaoishi na VVU umejiunga navyo?
    i. Vikundi vya jamii
    ii. Vikundi vya msaada wa kijamii na kisaikolojia
    iii. Sijajiunga kwenye kikundi chochote
17. Tarehe ya kuzaliwa mtoto ……/Umri wa sasa ……

18. Jinsia
    i. Mme
    ii. Mke
19. Dawa za kuzuia maambukizi ya VVU alizopata
    i. Nevirapine
    ii. Zidovudine
    iii. Hakupata dawa yeyote
20. Njia ya ulishaji wa mtoto
    i. Unyonyeshaji kwa miezi 6
    ii. Maziwa mbadala
    iii. Chakula mchanganyiko
21. Umeshawahi kusikia kuhusu huduma ya upimaji wa maambukizi ya VVU kwa watoto?
    i. Ndiyo kama ndiyo endelea swali namba 22
    ii. Hapana
22. Lini ulisikia habari za upimaji wa VVU kwa watoto
    i. Kabla ya ujauzito
    ii. Wakati wa ujauzito
    iii. Baada ya kujifungua
23. Ulipata wapi taarifa hizo
    i. Televesion/radio
    ii. Kipeperushi/ jarida
    iii. Mhudumu wa afya
24. Mtoto wako ameshapimwa hali ya maambukizi ya virusi vya UKIMWI?
    i. Ndiyo kama ndiyo endelea swali la 25
    ii. Hapana kama hapana endelea swali la 27
25. Tarehe ya kupima hali ya maambukizi ya VVU ya mtoto……../ Umri wakati wa kupima …….
26. Mambo gani yaliyokusukuma kumpima mwanao hali ya maambukizi ya VVU
    i. Ushauri wa upimaji kutoka kwa mhudumu wa afya
    ii. Hamu ya kutaka kujua kama mwanangu amepata maambukizi
    iii. Mengineyo (Elezea) …….

27. Mambo gani yamekufanya kutokumpima mwanao hali ya maambukizi ya VVU
    i. Hofu
    ii. Sikujua kuhusu upimaji
    iii. Mengineyo (Elezea) …….
28. Ni mara ngapi unamleta mtoto wako kwenye kliniki ya uzazi na watoto?
    i. Kila mwezi mara moja
    ii. Kila baada ya miezi miwili
    iii. Mengineyo (Elezea) ……..
29. Ni mara ngapi unamleta mtoto wako kwenye kliniki ya ufuatiliaji wa hali ya maambukizi ya VVU?
    i. Kila mwezi mara moja
    ii. Kila baada ya miezi miwili
    iii. Mengineyo (Elezea) ……..
    iv. Sina kawaida ya kumleta
30. Mtoto wako anapata dawa ya Septrine?
    i. Ndiyo endelea swali la 31
    ii. Hapana endelea swali la 32
31. Ni mara ngapi unamleta mtoto kwa ajili ya kupatiwa dawa ya Septrine?
    i. Kila mwezi mara moja
    ii. Kila baada ya miezi miwili
    iii. Mengineyo (Elezea) ……..
32. Umeshapata majibu ya hali ya maambukizi ya mtoto wako?
    i. Ndiyo kama ndiyo endelea swali la 33
    ii. Hapana kama hapana endelea swali la 34
33. Majibu ya hali ya maambukizi ya VVU kwa mwanao
    i. Ana maambukizi
    ii. Hajapata maambukizi
    iii. Sijui hali ya maambukizi
34. Kwanini hujapokea majibu ya hali ya maambukizi ya VVU kwa mtoto wako?
    i. Hofu
    ii. Majibu yalicheleweshwa sana
    iii. Umbali mrefu wa kuja kuchukua majibu iv. Mengineyo (Elezea)

8.7 APPENDIX VII: CHECKLIST

Utilization of the HIV early infant diagnosis and associated factors in Coast region, Tanzania

	Question	Y	
1	EID services available		
	Date of commencement of EID services		
2	Trained HCWs on EID		
	Number of female HCW trained		
	Number of Male HCW trained		
3	Number of HCWs perform EID		
4	Number of days/ week EID clinic conducted		
5	Facility have RCH 1 cards		
	Duration when there were stock outs of RCH cards		
6	Exposure status recorded in the RCH 1 cards		
7	HCWs at the registration desk check for HIV exposure status		
8	HCWs at the registration desk have knowledge on EID services		
9	HCWs at the registration desk refer HEI to EID services		
10	Availability of Job aids i.e. guidelines, algorithm, posters		
	Are these job aids in use		
11	Availability of DBS materials, cotrimoxazole drugs		
12	Regular stock out of DBS materials		
13	Regular refill of DBS materials		
14	Documentation for results, follow up, growth monitoring.		
15	Parents advised when to come		
16	Is sample transportation system in place		
17	Sample transported in a weekly basis		
	How many times in a week sample transported		
18	Is there any psychosocial support group for PLWHA especially infected mothers		