MISSED OPPORTUNITIES FOR HUMAN IMMUNODEFICIENCY VIRUS TESTING AMONG MOTHERS DELIVERING AT KAMPALA INTERNATIONAL UNIVERSITY TEACHING HOSPITAL, UGANDA

FARHIYA MOHAMMED MBChB (UNIVERSITY OF NAIROBI)

MMED/2583/153/DF

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF MEDICINE IN OBSTETRICS AND GYNECOLOGY OF KAMPALA INTERNATIONAL UNIVERSITY

APRIL 2019

DECLARATION

I, Dr. Farhiya Mohammed hereby declare that this research dissertation titled *"Missed opportunities for Human Immunodeficiency Virus testing among mothers delivering at Kampala International University Teaching Hospital"* is original and has not been submitted to any other institution for an academic award.

PRINCIPAL INVESTIGATOR

Signed..... Date..08/4/2019

Dr. Farhiya Mohammed

MMED/2583/153/DF

Kampala International University Teaching Hospital, Western campus,

P.O. Box 71, Bushenyi

Uganda.

APPROVAL

I have supervised Dr. Farhiya Mohammed in the process of developing this research dissertation titled *"Missed opportunities for Human Immunodeficiency Virus testing among mothers delivering at Kampala International University Teaching Hospital"* and I hereby recommend this work to be forwarded to the to next level for consideration.

SUPERVISORS

1. SIGNATURE..... Date..08/04/2019.....

Assoc. Professor Ivan Bonet Fonseca (Second Degree, Fetal Maternal Specialist).

Head of Department Of Obstetrics and Gynaecology.

Kampala International University, Western Campus

2. SIGNATURE..... Date..08/4/2019.....

Assoc. Professor Emilio Sanchez (Second Degree, Fetal Maternal Specialist).

Department Of Obstetrics nd Gynaecology.

Kampala International University, Western Campus

ACKNOWLEDGEMENT

Above all, I thank the Almighty God for the guidance through out the research. I am particularly grateful to my supervisors and mentors particulary Prof. Bonet Ivan, Prof. Emilio Sanchez and Dr. Emmanuel Nzabandora for their support while developing this book. I acknowledge the staff, interns and the residents in Obstretrics and Gynecology department, whose critiques and corrections were invaluable during the course of developing this research. I also acknowledge the contribution of the research participants without whom this research would not have been possible, i thank you. Finally, i would like to acknowledge my parents and siblings for their words of encouragement and financial support and in a special way i want to thank my daughters for their constant love and prayers.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Background: Although HIV testing should be routinely offered during Antenatal care, the proportion of women giving birth without knowing their HIV status in Uganda is still significant despite attending antenatal clinics therefore highliting the significance of testing these women during labour.

Objectives: To determine the prevalence of missed opportunities for HIV testing and associated factors among mothers delivering at KIUTH.

Methodology: A cross-sectional study of 218 consecutively enrolled participants using investigator questionnaire conducted from June to September 2018.

Results: The prevalence of missed opportunities for HIV testing was 11% and age was significantly associated with missed opportunities for HIV testing (P=0.040). The prevalence of HIV seropositive results was found to be 4.2%. This was also a seroconversion prevalence. The major factors associated with missed opportunities for HIV testing were multiparity, obtaining PMTCT information from VHTs and mothers who don't attach any sociomarital consequences to a positive HIV test result.

Conclusion: A significant proportion of mothers who delivered were found to have missed opportunities for HIV testing during labor. There was evidence of HIV seroconversion and possible mother to child transmission noted. Multiparity, obtaining MTCT information from VHTs and mothers who don't attach any sociomarital consequences to a positive HIV test result are significant factors contributing to missed opportunities for HIV testing.

Recommendations: Equipping labour wards with HIV rapid tests and sensitizing medical personnel in identification of women with missed opportuinities for HIV testing during labor. To advocate for effective conselling after HIV testing for women who are found negative in antenatal clinics so as to increase their risk perception for HIV infection even during pregnancy to reduce seroconversion rates. Studies to help us further our understanding how multiparity, the role of VHTs as a source of PMTCT information and not attaching any sociomarital consequenses to a positive HIV test result by the mother brings about missed opportunities for HIV testing during labor and even pregnancy.

LIST OF ACRONYMS

ACOG	American College of Obstetrics and Gynaecology.
ANC	Antenatal Care
CDC	Centre of disease control and prevention
CHAI Clinic	Community HIV/AIDS Initiative Clinic
EDD	Expected Date of Delivery
EGA	Estimated Gestational Age
EMTCT	Elimination of mother-to-child transmission
HIV	Human Immunodeficiency Virus
KIU-TH	Kampala International University Teaching Hospital
LNMP	Last Normal Menstrual Period
MOH	Ministry Of Health
MTCT	Mother-to-child transmission
PITC	Provider Initiated Testing and Counseling
PMTCT	Prevention of Mother-to-Child transmission
SPSS	Statistical Package for the Social Sciences
VHT	Village Health Team
WHO	World Health Organization
WOA	Weeks of Amenorrhea
UAC	Uganda AIDS Commision

CHAPTER ONE
INTRODUCTION

1.1 Background

Human Immunodeficiency Virus (HIV) has become a global burden with more than 70 million people getting infected since the beginning of the epidemic and about 35 million people having died of HIV in the same period of time (UNAIDS, 2017).. Globally, 36.7 million people were living with HIV at the end of 2016 with 1.0 million people dying of HIV-related illnesses (Uganda AIDS Commission, 2017). Around 30% of these same people do not know that they have the virus (UNAIDS, 2017).

Worldwide, majority of the HIV infected persons are found in Sub-Saharan Africa. For example, in 2016, an estimated 25.5 million people living with HIV were found in sub-Saharan Africa (Zaba *et al.*, 2013). Also, according to global statistics, more than half of all people living with HIV are women with the majority of them living in sub-Saharan Africa (Heemelaar *et al.*, 2015) which is the most severely affected region, with nearly 1 in every 25 adults (4.2%) living with HIV and accounting for nearly two-thirds of the people living with HIV worldwide (UAC, 2015). And although the global incidence of HIV infections among children halved from 300,000 in 2010 to 160,000 in 2016 (47%), there is more need to reduce the Mother-to-child transmission of HIV especially in the less developed countries (WHO, 2015).

A study done in 2012, showed that the number of new HIV infections in South African children reached its highest in 2002 and dropped by 2008. This incidence was lower than the level of pediatric HIV incidence that would have been expected over the same period in the absence of PMTCT (Johnson *et al.*, 2012). So PMTCT programme was important in curbing the incidence of HIV infection. PMTCT programmes reduced transmission from pregnant mothers who were seropositive at their first antenatal visit; although, there was negligible impact on transmission from recently infected mothers. Therefore, the proportion of vertical transmission from recently infected mothers has increased although most of the vertical transmission from mothers who have acquired HIV after their first antenatal visit occurs in the postnatal period because there is more opportunity for maternal sero-conversion during the long breastfeeding period than during the relatively short period between first antenatal visit and delivery (Johnson *et al.*, 2012), which implies that effective prevention of mother-to-child transmission (PMTCT) of HIV can reduce

the vertical transmission risk (Zeng et al., 2016b). It is in the light of this development that the Centers for Disease Control and Prevention (CDC) in the United States of America have set a goal of eliminating perinatal human immunodeficiency virus (HIV) transmission. CDC defines elimination of transmission as a reduction of transmission to an incidence of less than 1 infection per 100,000 live births and to a rate of less than 1 percent among infants exposed to HIV (AIDSinfo, 2015).

HIV was first discovered in Uganda in the 1980s, but spread rapidly and by the early 1990s the average national HIV prevalence was 18% in rural areas and 25%–30% in major urban areas. The transmission of HIV from mother to child is the second most common route of transmission of HIV in Uganda. The risk of HIV transmission from mother to child is approximately 45% if no safety measures have been taken (Sandqvist *et al.*, 2011).

Similar to the approach by CDC, Uganda is committed to the goal of ending the HIV/AIDS epidemic as a Public Health threat by 2030 with a plan to implement a five component programme two of which the which are directly addressed to pregnant women, that is, "Consolidate Elimination of Mother to child Transmission of HIV" and "Accelerate the implementation of Test and Treat and attainment of 90-90-90" with emphasis given to promotion of male utilization of services (UAC, 2015).

Although HIV is still a challenge in Uganda, despite the growing awareness of the infection, the country met the 2015 target of fifteen million people on treatment and is on track to double that number to thirty million and meet the vision 2020 target, having lost close to 2 million people to HIV (UAC, 2017). Currently, there are about 1.4 million Ugandans living with HIV, with up to 83,000 having contracted HIV in 2016 which is equivalent to 227 infections per day and equivalent to 9 infections per hour, a rate which is unacceptably high. Relatedly, 28,000 Ugandans died of HIV-related illness in the same year, equivalent to 77 deaths per day (Uganda AIDS Commission, 2017).

HIV testing should be routinely offered during antenatal care, the proportion of women giving birth without knowing their HIV status in Uganda is still significant. This is in spite of the fact that they attend antenatal care in hospitals. Worse still is the fact that a large proportion of pregnant women who do not attend antenatal care end up delivering in the hospital showing the significance of testing these women during labor. The rapid testing for HIV is significantly

acceptable by pregnant women in labor rooms (Mwembo-Tambwe *et al.*, 2013), hence adopting testing during labour is quite achievable for these women who have not tested during antenatal care. Voluntary counseling and Testing (VCT) is accepted in labor rooms and this strategy combined with antenatal care testing may reduce the rate of vertical transmission further.

According to Livingston, (2002), all pregnant women are recommended to screen for HIV infection at their first booking antenatal visit, as part of the Infectious Diseases in Pregnancy Screening (IDPS) Programme. Livingston further put it clearly that if a woman tests HIV negative at booking but is judged as being at continued high risk of acquiring HIV, offering a repeat HIV test should be considered in late pregnancy or during labor (Davison *et al.,* 2007).

According to Centres for Disease Control (2015), pregnant women with HIV may not know they are infected. CDC recommends HIV testing for all women as part of routine prenatal care. According to CDC research, more women take the prenatal HIV test if the opt-out approach is used. Opt-out prenatal HIV testing means that a pregnant woman is told she will be given an HIV test as part of routine prenatal care for pregnant women unless she opts out, that is, chooses not to have the test. CDC recommends a second test during the third trimester of pregnancy.

The burden of morbidity and mortality related to pregnancy is also higher in women with Human Immunodeficiency Virus (HIV). For example, South Africa is among the top countries with high HIV prevalence globally and the cause of mortality among HIV pregnant women was pregnancy-related infections than their uninfected counterparts (UNAIDS, 2012). Also, a study comparing complications among HIV associated pregnancies versus non HIV associated pregnncies showed that HIV infected pregnancies had a greater risk of complications compared to their uninfected counterparts (G. B. Theron *et al.*, 2011).

World Health Organization recommends expedited HIV testing at the time of labor or delivery for any woman with undocumented HIV status; in which case if results are positive, intrapartum and infant postnatal antiretroviral (ARV) drug prophylaxis should be initiated immediately, pending results of supplemental HIV testing. HIV testing during labor is, therefore, feasible, accurate, timely, and useful for ensuring prompt initiation of intrapartum and neonatal ARV prophylaxis, and in reducing perinatal transmission of HIV (WHO, 2017). Women with undocumented HIV status should , therefore be tested during labor or delivery although the most practically sound and more rewarding option would be to screen pregnant mothers prenatally at

booking for the first antenatal visit and in third trimester as compared to durirng delivery time as this poses more risk of vertical transmission and totally missing out on prevention of vertical transmission to the unborn neonate.

In a world that is fast moving from its first policy of prevention of mother to child transmission of HIV to Elimination of Mother To Child Transmission of HIV, preventable reasons like application of HIV testing during antenatal care as per the laid down policy by WHO, should be followed globally. This brings about the importance of detecting missed opportunities for HIV testing during antenatal period to be able to find out associated factors for preventing HIV testing during this period. It is upon this background that this study was proposed to determine the prevalence of missed opportunities for Human immunodeficiency testing among mothers delivering at KIUTH.

1.2 Problem statement

Elimination of mother to child transmission (EMTCT) can be achieved after a Human Immunodeficiency Virus (HIV) positive pregnant woman is identified. Hence each incidence of HIV infection in a child for mothers who were not tested during antenatal period can reflect a missed opportunity for EMTCT program. Despite the interventions put in place to reduce transmission of HIV to the newborn through routine screening for HIV in all pregnant women, the rate of transmission of HIV to newborn is still high as described by Lockman & Creek, (2017) and Theron *et al.*, (2011) and this has been attributed to maternal sero-conversion during pregnancy (Lockman & Creek, 2017).

Kampala International University Teaching Hospital (KIUTH) which is found in one of the highest HIV endemic region of western Uganda (UAC, 2015), conducts a minimum of two hundred deliveries per month. In July 2017, 237 deliveries were conducted and only 10 of these women had a documented HIV status according to the KIU-TH maternity register (unpublished records from maternity registry). These women with an unclear HIV status are treated as HIV negative and their labor is managed normally, with no EMTCT intrapartum interventions done (unpublished records from maternity registry). This puts the mother's unborn child at increased risk of MTCT of HIV especially during the intrapartum period and postpartum which leads to increased neonatal and infant mortality rates with half of HIV infected children dying before their second birthday (UNAIDS, 2012). It is also not known why the mothers admitted in

maternity ward at KIU-TH do not have an up-to- date HIV testing status as the factors behind the missed opportunities for HIV testing have not been studied in KIU-TH. The rate of sero-conversion among these mothers admitted for delivery at KIU-TH is also not known.

1.3 Objectives of the study

1.3.1 General objective

To determine the prevalence of missed opportunities for HIV testing and associated factors among mothers delivering at KIUTH.

1.3.2 Specific objectives

1. To determine the overall prevalence and age specific prevalence of missed opportunity for HIV testing among women delivering at KIUTH.
2. To determine the prevalence of HIV sero-positivity among women with missed opportunity for HIV testing who are delivering at KIUTH.
3. To determine the factors associated with missed opportunities for HIV testing among women delivering at KIUTH.

1.4 Research question

1. What is the overall prevalence and age specific prevalence of missed opportunity for HIV testing among women delivering at KIUTH?
2. What is the prevalence of HIV sero-positivity among women with missed opportunity for HIV testing who are delivering at KIUTH?
3. What are the factors associated with missed opportunity for HIV testing among women delivering at KIUTH?

1.5 Study justification

Knowing the magnitude of missed opportunities for HIV testing and that of those who actually turn HIV seropositive among the women delivering at KIU-TH will reflect whether there is an unmet goal for elimination of mother to child transmission (EMTCT) or not. This will also help evaluate directly the EMTCT programme and whether or not the program is moving towards achieving its set goals and purposes or not. This study will also bring about a knowledge-based approach to the barriers hindering the effectiveness of HIV testing among these women.

In a world where prevention of HIV transmission to the newborn is of paramount importance, detection of missed opportunities for HIV testing among women who are delivering at KIUTH

will help in providing the basis for strategies for improving screening and sensitization of the mothers and clinicians about the importance of HIV testing. For those women who test positive to HIV, they will have the benefit of having EMTCT interventions started on them for example starting antiretroviral treatment intrapartum and other appropriate measures taken to prevent infection in the newborn, and instituting measures and interventions in labor that otherwise would not have been done if they were assumed still negative for HIV.

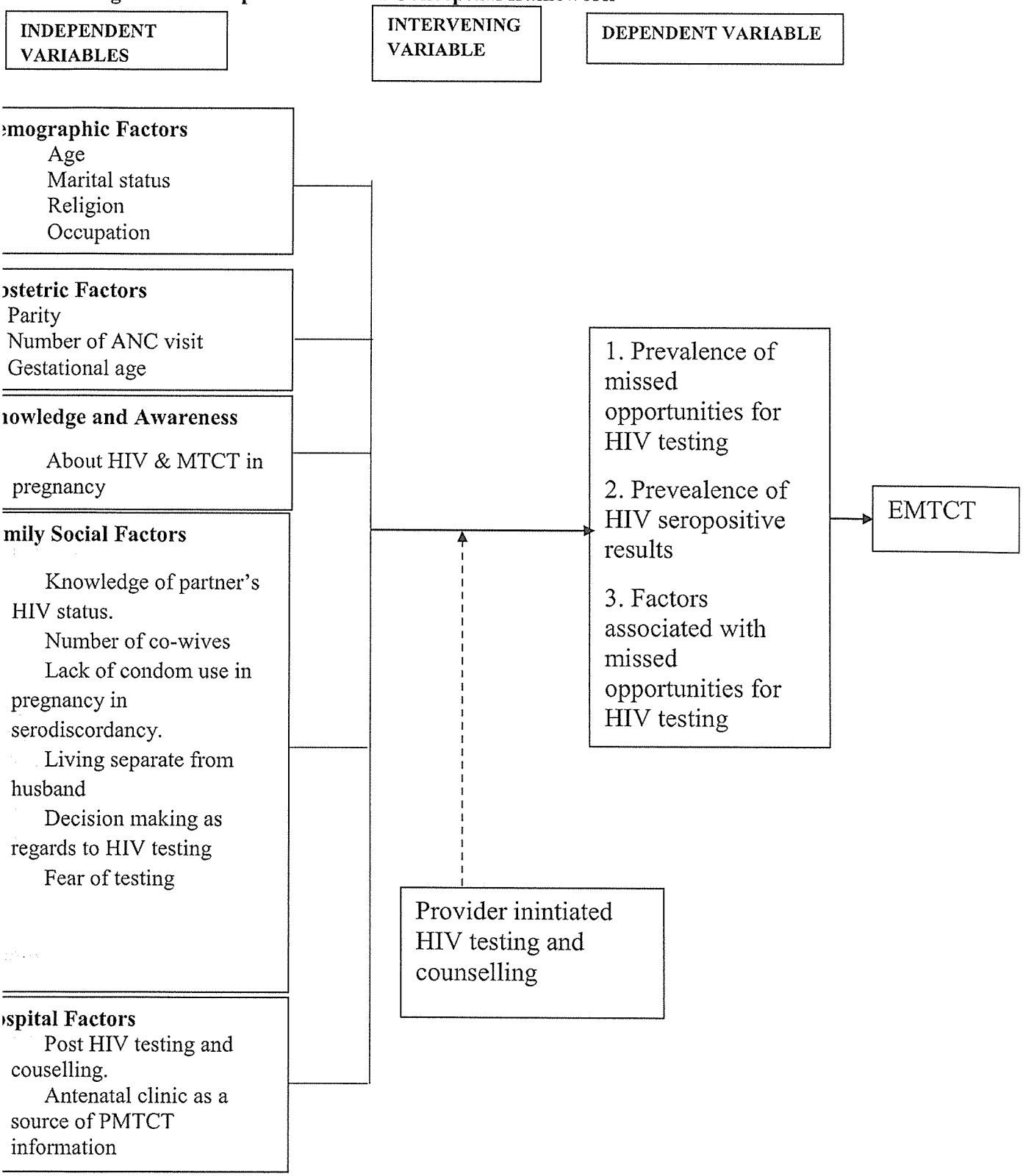
1.6 Significance of the study

Results of this study will provide the basis for increased awareness of the Human Immunodeficiency Virus (HIV) testing at Kampala International University Teaching Hospital (KIUTH) and may help to provide grounds for the development of protocols that can be used during labor which could aid in the availability of testing kits. With appropriate information available, ART can be initiated promptly and in the future these mothers can take control over their reproductive lives like planning their pregnancies. Prevention of HIV transmission to the unborn fetus will eventually lead to reduction of HIV related neonatal and infant morbidity and mortality. This may, in turn, enable a healthy and productive generation to be brought up.

Knowledge and awareness at the community level about the importance of Human Immunodeficiency Virus (HIV) in pregnancy will lead to reduction in misconceptions and beliefs that make pregnant mothers vulnerable to HIV infection and transmission to the fetus. This will motivate pregnant mothers to initiate antenatal care early and request for HIV testing as per the elimination of mother to child transmission protocol. The knowledge obtained from this study may also help to create awareness and in the long run benefit the community through reduction of maternal and neonatal morbidity and mortality caused by HIV that is brought about by preventable barriers to HIV testing during their antenatal period.

The knowledge obtained from assessing the factors associated to missed opportunities for routine Human Immunodeficiency Virus (HIV) testing will help to design measures to overcome them and also increase counseling and testing of the pregnant mothers as per the HIV testing protocol. Furthermore the results obtained can serve as a benchmark for future references to the ever growing body of studies relating to missed opportunities for HIV testing in sub-saharan Africa and the world.

1.7 Diagrammatic representation of Conceptual framework



1.7.1 Narrative of conceptual framework

The study involved women who were in labour and those in the immediate post-partum period. The study looked at several patient-related intervening variables of major importance like demographic factors, obstetric factors, family social factors, knowledge and awareness-related factors and hospital factors like post HIV test counselling and whether ANC played a role in disseminating information regarding PMTCT were also assessed. These were assessed as to how they influenced the dependent variable which was the missed opportunities for HIV testing among women delivering in KIU TH.

Voluntary counseling and testing was also assessed as an intermediate variable that influences testing for HIV among women during pregnancy. Since some women are counseled for HIV antibody testing but still refuse to test, the reasons given as to why they refuse were assessed as part of the barriers to testing for HIV, leading to missed opportunities seen in these women who attend antenatal care but still refuse to get tested despite counseling.

1.8 Scope

1.8.1 Content Scope

The study was limited to those mothers in labor and the women who were in immediate post-partum period, including those who were tested or never tested for Human Immunodeficiency Virus (HIV) including those who claimed to have been tested but had no written documentation of the result of the test and also those who were last tested more than three months prior to delivery. This enabled the researcher to determine the overall and the age-specific prevalence of those with missed opportunities for HIV testing, the prevalence of those who had HIV seropositive results among the women with missed opportunities and the factors influencing these missed opportunities for HIV testing. The factors like the demographic factors and obstetric factors. Knowledge and awareness factors as regards HIV as a disease and its route of transmission to the unborn child. Hospital factors to determine whether or not antenatal clinics provides this information, attending antenatal care clinics and whether or not they were counselled and tested for HIV. Family social factors that can lead them to contract HIV during pregnancy like being in a polygamous marriage, knowing their spouses HIV status, decision making as regards HIV testing, fear of testing were also assessed. The women with missed opportunities for HIV testing, then underwent provider inniciated counselling and testing for HIV of which they could opt-out at any time. Those who turned out to be HIV positive received

immediate Elimination- of- Mother To-Child-Transmission intervention in labor. Anti-Retroviral Therapy was also instituted to the mother and nevirapine syrup to the neonate and, upon discharge, both were linked up to HIV clinic for further counselling including couple counselling and testing, treatment and long-term follow up.

1.8.2 Geographical Scope

The study was conducted among admitted mothers who were in labor and mothers who had just delivered and were in the immediate postpartum at Kampala International University Teaching Hospital (KIU-TH). Mothers who met the eligibility criteria were recruited from labor suite and postnatal room and a private side room was allocated to them for purposes of the study and Human Immunodeficiency Virus counselling and testing was done. The study participants were selected from the catchment areas of KIU-TH and these included areas like Bushenyi, Sheema, Rubirizi, Mitooma and other neighboring districts.

1.8.3 Time Scope

The study was conducted over a time period of three (3) months starting from July 2018 to September 2018.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The human immunodeficiency virus (HIV) pandemic is one of the most serious health crises the world faces today. Globally, 36.7 million people were living with HIV at the end of 2016 with 1.0 million people dying of HIV-related illnesses (Uganda AIDS Commission, 2017). A disproportionate burden has been placed particularly on women and children who in many settings continue to experience high rates of new HIV infections and of HIV- related illness and death (WHO, 2006). Sub-Saharan Africa remains the most severely affected, with nearly 1 in every 25 adults (4.2%) living with HIV and accounting for nearly two-thirds of the people living with HIV worldwide (Uganda AIDS Commission, 2017).

According to the recent global statistics, more than half of all people living with HIV are women (Heemelaar et al., 2015a). HIV is the leading cause of death in women of reproductive age globally. According to a report by the UNAIDS (2017). In 2015, 17.8 million individuals living with HIV globally were women aged 15 years and older and 1.8 million were children under 15 years of age. More than 90% of HIV positive pregnant women reside in sub-Saharan Africa and unfortunately, about 30% of these people do not know that they have the virus (UNAIDS, 2017).

In 2016, an estimated 1.4 million Ugandans were living with HIV, and an estimated 28,000 died of AIDS-related illnesses. The epidemic is firmly established in the general population. As of 2016, the estimated HIV prevalence among adults (aged 15 to 49) stood at 6.5%. Women are disproportionately affected, with 7.6% of women living with HIV compared to 4.7% of men (MOH Uganda, 2016).

In Uganda, mother-to-child-transmission of HIV is virtually the only way that children under five years of age acquire the virus. Uganda is ranked seventh among the countries contributing to the high burden of vertical transmission of HIV. 95% of HIV infection in children is a result of mother-to-child transmission, and this transmission occurs in 30-40% of HIV-positive pregnant women (KMCC, 2015). This is attributed to the high population growth of 3.3%, high fertility rate of 6.2%, low contraceptive prevalence rate (CPR) of 34%, and high prevalence of HIV among women of reproductive age at 8.3% (Unite for children. Unite against AIDS, 2010).

Whereas there have been significant gains in the response to HIV and AIDS among adults, the burden among children remains a great concern to the health sector. This is particularly critical given the fact that cost effective interventions capable of eliminating pediatric HIV and AIDS have been available for over a decade. In Uganda, it is estimated that with the relatively high prevalence of HIV among women of reproductive age at 8.3%, without the elimination of mother-to-child transmission of HIV (eMTCT) services, up to 27,000 children will be born with HIV annually (MOH, 2018). Indeed without treatment it is estimated that half of the HIV infected children will die before their second birthday, contributing to high infant and under 5 mortality rates. It is also estimated that about 1,560 HIV positive mothers will die each year unless effective interventions for treatment of HIV are implemented. Access to comprehensive HIV services reduces the risk of transmission to below 5% in communities that practice breast feeding, and to 2% in the communities that do not practice breastfeeding (MOH Uganda, 2014).

2.2 Prevalence of missed opportunities among pregnant women

Identifying the prevalence of HIV testing before or during pregnancy and understating factors related to receiving this test is critical to developing strategies to increase HIV testing rates for pregnant women and reduce mother-to-child transmission of HIV (Dehghanifirouzabadi & Qobadi, 2015). The Centers for Disease Control and Prevention (CDC) (2015) recommends HIV testing for all women as part of routine prenatal care (Kudakwashe *et al.,* 2014). In their 5-year report covering 2008-2012, Liao *et al.,*found that 23% of maternal HIV infection remained undiagnosed until the intrapartum and postpartum period, which was higher than the estimated 13% of people living with HIV, who were unaware of their infection. And of all the live births to HIV positive mothers, 1.7% seroconverted during pregnancy, representing a 25% increase annually over a five year period (Liao *et al,* 2017).

According to a study conducted in the USA by Jamieson *et al.*, (2007), approximately one quarter of HIV infected persons are unaware that they are infected. It is particularly important that pregnant women know their HIV status, both for their own health status and the need to prevent transmission to their unborn babies. Because of the implementation of several effective strategies, including the use of combination antiretroviral prophylaxis, elective cesarean delivery, and avoidance of invasive obstetric procedures and breast-feeding, perinatal HIV transmission rates have dramatically decreased in the US over the past decade. The problem is that to

implement these strategies successfully, a pregnant woman and her health care provider must be aware of her HIV status. Guidelines recommend HIV testing for all pregnant women. These include routine opt out testing, in which pregnant women are notified that HIV testing is included as a routine prenatal test to be performed unless they decline. However, women who do not obtain prenatal care are unlikely to be tested for HIV during pregnancy. Even women who receive prenatal care may not be offered or accept testing. Because most women in the US deliver in hospitals, rapid HIV testing on labor and delivery units is the last opportunity to identify HIV infected women before delivery and to provide antiretroviral prophylaxis to prevent perinatal transmission during labor and delivery (Jamieson *et al.,* 2007).

In China, studies by Zeng *et al* (2016) indicated that the proportion of women infected with human immunodeficiency virus has doubled over the past decade which suggests a continued risk of MTCT of HIV. Worse still is that a significant population of these women do not know their HIV status during pregnancy and delivery. This puts their unborn children at great risk of vertical transmission with HIV (Zeng et al., 2016).

According to Tamil Kendall (2014) in Mexico, HIV testing during pregnancy permits prevention of vertical transmission and provides an opportunity for women living with HIV to access treatment for their own health. In his study on consequences of missed opportunities for HIV testing during pregnancy and delayed diagnosis for women, children and male partners in Mexico in 2011, only 45.6% of women who attended antenatal care were tested for HIV. When not diagnosed during antenatal clinic, women had multiple contacts with the health-care system due to their own and other family members' AIDS-related complications before being diagnosed. Missed opportunities for HIV counseling and testing during antenatal care and health care provider's failure to recognize AIDS related complications resulted in pediatric HIV infections, AIDS related deaths of children and male partners, and HIV disease progression among women and other family members (Kendall, 2014).

In a study report by Merchant & Lala (2005), the peripartum and breastfeeding period are very crucial points of focus for efforts to prevent mother-to-child transmission. Therefore, identifying women with HIV infection that was not detected in the antenatal period is critical because it gives reason for interventions to be put in place to prevent MTCT (Merchant *et al.,* 2005). According to a report by the World Health Organization (2011), more than 70% of pregnant

women in sub-Saharan Africa attended ANC at least once during pregnancy in 2009. This suggests that some women do not attend antenatal care so testing during labor is worth doing for those with unknown HIV status (Joseph *et al.,* 2017).

In a study conducted in Nigeria involving a total of 224 parturients by Ukaire *et al* (2015), uptake for the intrapartum HIV testing and counseling was 99.55%. Only 1 woman declined re-testing in labour as she believed she could not have been infected after testing negative in early pregnancy. She however accepted testing in the immediately post-partum period following further counseling. The mean turnaround time for availability of results in the initial phase of the study when HIV rapid tests were carried out in the hospital laboratory was 288 ± 34.9minutes while the turnaround time when rapid tests were done in the labour ward was 16.17 ± 2.1minutes. The turn-around time for the initial phase was significantly higher than the turnaround time when the tests were conducted in labour ward. The time interval between the first HIV test among parturient with initial HIV negative results and repeat HIV test in labour ranged from 6 to 31 weeks with a mean time interval of 17.99 ± 7.2 weeks. The sero-prevalence of undiagnosed HIV infection among all parturient in this study was 2.68%. The prevalence of HIV infection among parturients with unknown HIV status was 6.78%, while HIV sero-conversion occurred in 1.21% of parturients with initial HIV negative status (Ukaire *et al.,* 2015).

In a different study by Nyoyoko and Umoh (2016) titled "The prevalence and determinants of HIV seroconversion among booked antenatal clients in the university of Uyo teaching hospital, Uyo Akwa Ibom state, Nigeria", 3% of study participants tested positive (seroconverted) when re-tested for HIV infection during labor. Majority (40%) of these were aged 25 to 29 years, married (98%) and resided in urban areas (87.6%) (Lubega *et al.,* 2017).

In rural Zambia, the prevalence of women with an unclear HIV status due to Missed opportunities for HIV testing was found to be 53.1% (Heemalaar *et al,* 2015). A further analysis showed that in Lusaka, 10% of pregnant women are generally retested for HIV during antenatal care. This led to a study being conducted at Chilenge Clinic in Lusaka, Zambia further proving that 36% of women who delivered in that clinic had not been retested for HIV and had an undocumented HIV status at time of labor (Agnes Mtaja, 2013). In east Africa, several studies have been done on Missed opportunities for HIV testing hindering elimination of mother to child

transmission of HIV. In a qualitative study on implementation of repeat HIV testing during pregnancy in Nyanza region-Kenya, in 2015; Weke and his colleagues revealed rates of repeat HIV testing at time of labor of 24.2% (Weke *et al.,* 2016).

In a study report by Ulrika *et al* (2015), Tanzania and Uganda screening for HIV among pregnant women during antenatal was noted to be at 65% for Tanzania and only 37% for Uganda, an indication of a big number of missed opportunities amongst pregnant women during pregnancy (Ulrika Baker *et al.*, 2015). In their study at Mulago national referral hospital in central Uganda, Ononge and his colleagues (2014) noted the prevalence of unknown HIV serostatus at time of labor to be 27.1%. This is a big threat towards elimination of mother to child transmission of HIV strategy in Uganda (Sam Onongea *et al.,* 2014).

2.3 Factors associated with missed opportunities during pregnancy

2.3.1 Demographic factors

Opportunities to detect HIV infection may be missed leading to high rates of mother to child transmission. In a systematic review involving a total of 24 studies published in international peer-reviewed journals and meeting so as to determine the barriers to HIV testing in Europe, Jessika *et al* (2010) found that fourteen studies reported on barriers at the level of the patient; six on barriers at health care provider level and seven on institutional barriers referring to the policy level. The barriers described were centralized around low-risk perception; fear and worries; accessibility of health services, reluctance to address HIV and to offer the test; and scarcity of financial and well trained human resources (Deblonde *et al.,* 2018).

In a study to estimate prevalence of women with unknown HIV status and to explore the associations between socio-demographic characteristics, health care access and HIV testing among pregnant women in the US by Dehghanifirouzabadi and Qobadi on a population of 2,722 pregnant women during labour, 30.3% of pregnant women had never been tested for HIV. And among these women, only 24% had past year HIV testing. Non-Hispanic whites, those aged 18-24 years, married women, those with no insurance and no personal doctor had significantly higher rates of no lifetime HIV testing. Pregnant women aged 35-44 years (39.2%), those with annual income of $50,000 or more (32.9%) and those who were married (31.4%) had significantly higher rate of no past-year HIV testing. Among those who ever had an HIV test, married women were two times more likely to have no past-year HIV testing than unmarried

women, while, younger women (18-24 years old) were less likely to have no past-year HIV testing (Dehghanifirouzabadi & Qobadi, 2015).

In Tanzania, factors significantly associated with testing included receiving information on HIV testing during antenatal care, age, education and wealth. According to their study, women with primary education had more than twice the odds of testing and receiving results during ANC compared to those who had no education. In addition those who had secondary education or above had five times higher odds of testing and receiving results during ANC compared to those who had no education (Semali *et al.,* 2014).

2.3.2 Obstetric factors

Multiparity has been associated with missed opportunities to HIV testing as shown in several studies across Sub Saharan Africa. In a study by Bo & Ob, (2017) 31% of multiparous women said they were too busy to attend. Similar findings have also been reported by Boerleider *et al.,* (2013) According to Rogers *et al.*, (2017). parity was not significantly associated with missed opportunities.

2.3.3 Knowledge and awareness about HIV and PMTCT

In their study titled "Factors contributing to missed opportunities in the prevention of mother to child transmission programme in the sub-district of Ngaka Modiri Molema, North West Province, South Africa" Sithole & Khunou (2016) found that 0.8% of pregnant women were not tested for HIV infections and 9.6% had no information on testing. They found several factors contributing to missed opportunities in the PMTCT program. These included religious, cultural, ignorance, denial and lack of knowledge about PMTCT (Sithole & Khunou, 2016).

2.3.4 Family-Social factors

Socio-cultural and economic factors prevent women from accessing testing at an opportune time during pregnancy. Some of the reason given by participants for not testing were fear in 70% of the women and 15% felt the need to consult their partner first and could not make an autonomous decision (Preko *et al,* 2008). In a study conducted by V. Dahl and L. Mellhammar, 2008 on "Acceptance of HIV testing among women attending antenatal care in south-western Uganda, risk factors and reasons for test refusal", factors such as testing site, age between 30 and 34 years, mistrust in reliability of the HIV test and not having been tested for HIV previously were associated with test refusal and the most common reasons claimed for test refusal were lack

of access to antiretroviral therapy (ART) for HIV infected women, a need to discuss with partner before decision and fear of partner's reaction (V. Dahl & L. Mellhammar, 2008).

According to a study by Larsson and colleagues (2015) in Iganga and Mayuge districts in eastern Uganda; factors that hinder women from opting to test for HIV include the perceived stigmatizing nature of HIV care, (which may be an issue of inadequate knowledge) and perceived rude attitudes among health workers. In their study titled "Prevention of mother-to-child transmission of HIV in rural Uganda: Modelling effectiveness and impact of scaling-up PMTCT services", the low coverage of HIV testing seems to be the major bottleneck for successful PMTCT in these two districts (Larson, 2015).

In another study on HIV/AIDS stigma and refusal of HIV testing among pregnant women in rural Kenya, it was demonstrated that anticipated stigma regarding HIV/AIDS stigma can be a barrier to acceptance of HIV testing by pregnant women, even in an environment where HIV testing in the antenatal clinic is becoming the norm. In a location therefore where the prevalence of HIV is high, every woman who refuses HIV testing represents an important missed chance to prevent mother-to-child transmission and promote maternal and child health. In many other settings in Kenya and other sub-Saharan African countries, high rates of refusal of HIV testing by pregnant women continue to be seen, and it is likely that HIV/AIDS stigma plays a role in these settings as well. A woman's specific fears of stigma and negative events for herself after an HIV positive test result were important predictors of HIV test refusal (Suellen *et al.,* 2011).

In a publication titled 'Seizing the Big Missed opportunities: Linking HIV and Maternity Care Services in Sub-Saharan Africa', highlight the main factors associated with missed opportunities for HIV testing among pregnant women. These are stigma, low levels of male involvement and weak community mobilization. According to their study, services continue to struggle to attract participants and achieve adequate admissions rates in some settings, in part due to continuing stigma and discrimination surrounding HIV, including by providers, families and communities. This is often gender-based, in that women may receive an HIV test before their partner and are blamed for the infection (Druce and Nolan., 2007).

2.3.5 Hospital factors

In a qualitative study on implementation of repeat HIV testing during pregnancy in Kenya, Weke *et al* (2016) identified key barriers associated with missed opportunities at the client level from

the perspective of providers including late initial presentation to antenatal care and low proportions of women completing the recommended four antenatal visits. Barriers to offering repeat HIV testing for providers included heavy workloads, time limitations, and failing to remember to check for retest eligibility. At the facility level, inconsistent volume of clients and lack of space required for confidential HIV retesting were cited as barriers. Finally, at the health system level, there were challenges relating to the HIV test kit supply chain and the design of nationally standardized antenatal patient registers. Enablers to improving the implementation of repeat HIV testing included client dissemination of the benefits of antenatal care through word-of-mouth, provider cooperation and task shifting, and it was suggested that use of an electronic health record system could provide automatic reminders for retest eligibility (Weke *et al.*, 2016). Women who reported to have received information on HIV testing during ANC had more than seven times higher odds of testing compared to those who did not get such information. Women who reported to have two or more lifetime sexual partners had 47% higher odds of testing compared to those who had only one lifetime sexual partner (Semali *et al.*, 2014).

2.4 Missed opportunities for HIV testing among mother delivering

As per the literature review above, it is viewd that missed opportunities for HIV testing do occur and can be detected even in labour. With this study the results found will then help get a picture of the local statistics on prevalence of missed opportunities, prevalence of HIV seropositive results and help us determine factors associated with missed opportunities at the patients' level (demographic factors, obstetric factors and family social factors) and the hospital factors.

CHAPTER THREE
METHODOLOGY

3.1 Study design

A cross-sectional study was carried out so as to determine the prevalence of missed opportunities and the associated factors.

3.2 Study site and setting

The study was done in maternity ward at Kampala International University Teaching Hospital (KIUTH) located in Bushenyi- Ishaka municipality. It is approximately 60 kilometers (39 miles), west of Mbarara town. Kampala International University Teaching Hospital has a 700 bed capacity for in-patients. The Obstetrics and Gynecology department of Kampala International University Teaching Hospital has seven Obstetrics and Gyanaecology specialists, twenty-one resident doctors, five intern doctors and fourteen midwives.

The department has an antenatal clinic, a gynecology out-patient clinic and a ward that caters for both obstetric and gynecology cases. The ward has a 75 bed capacity and contains the following rooms: first stage room, second stage room, immediate post-operation room for monitoring the patient for the first twenty four hours, two post caesarian section rooms, two spontaneous vertex delivery rooms for women who have delivered vaginally, one prenatal room, two gynecology rooms, one room for pre-eclampsia women and two rooms for post-cesarean wound sepsis or post vaginal delivery septic patients. The department also has a theatre for emergency obstetric cases. The hospital delivers on average seven to ten women in a day. For gynecological emergencies the hospital has a major theatre which can be accessed anytime. Kampala International University Teaching Hospital has a fully functional modern referral laboratory that can cater for Human Immunodeficiency Virus testing. Human immunodeficiency virus (HIV) positive women once identified are linked to the hospital's Community HIV/AIDS Initiative clinic (CHAI clinic) for follow-up and treatment. The hospital has an ANC clinic that carries out HIV testing on pregnant women on first contact and for those found negative repeated every 3 months until delivery. In labor ward all women are tested for HIV regardless of prior testing results.

3.3 Study population

The study involved all pregnant adult women and emancipated minors, who were seeking intrapartum and immediate postpartum services at Kampala International University Teaching Hospital and had consented to participate in the study during the study period.

3.4 Selection criteria

3.4.1 Inclusion criteria

All pregnant adult women and emancipated minors who were seeking intrapartum and immediate postpartum services at Kampala International University Teaching Hospital (KIU-TH) and had consented to participate, this included those who tested or never tested for Human Immunodeficiency Virus (HIV) during their antenatal care, and those who claimed to have been tested but with no proven prior HIV test documentation in their antenatal book, or who had a documented HIV test negative result for a test conducted more than three months ago. Before testing these women were allowed to seek approval from their spouse or partner either in person, if the spouse or partner was present or through a phnonecall if spouse or partner was away (Uganda HIV Prevention and Control Act, 2014)

3.4.2 Exclusion Criteria

There was no one excluded from the study except those who did not consent.

3.5 Sample size determination

A sample size of 218 Human research partcipants was achieved at a 5% level of precision at 95% confidence level using the Daniel's formula as shown below

$$n = \frac{(z_{\alpha+}z_{\beta})^2 p(1-p)}{d^2}$$

Where α=0.05; β=0.2 at 80% power; p=7.5% as the HIV prevalence among women of reproductive age is 7.5% in Uganda (Pariyo *et al.*, 2012).

$$n = \frac{(1.96 + 0.84)^2 x 0.075(1-0.075)}{0.05^2}$$

n=218

So the overall sample size was 218

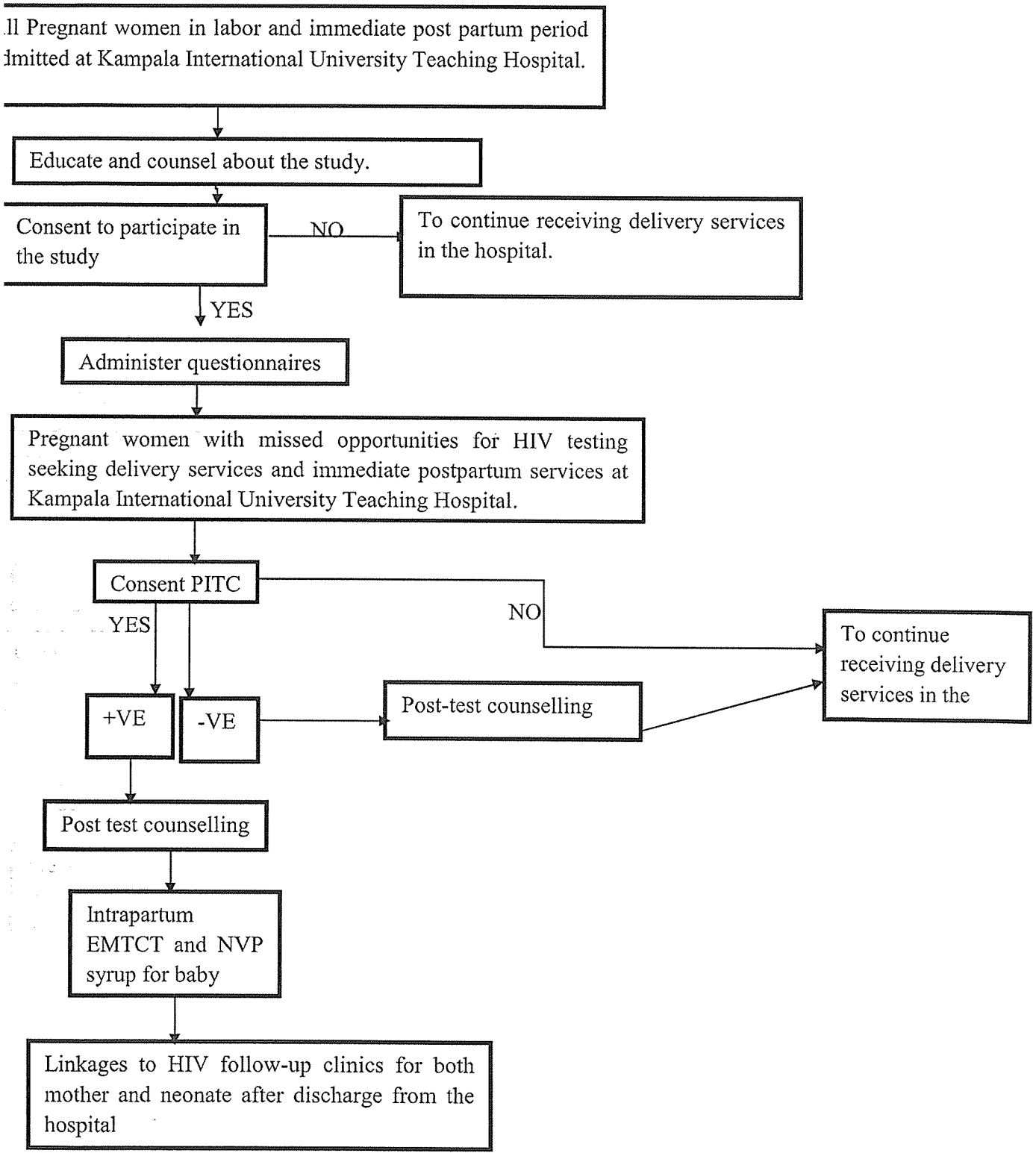
3.6 Sampling techniques

Eligible women were recruited into the study by consecutive sampling. This was done to ensure that the sample size was realized faster because not all pregnant women seeking intrapartum services at KIU teaching Hospital had missed opportunities for HIV testing

3.7 Feasibility study

It was feasible because KIU teaching hospital provided delivery services to an average 100-150 women in a month over the study period.

3.8 Flow diagram of study scope



Flow diagram by principal investigator

3.9 Data collection instruments

Investigator use pretested questionnaire and the documentation of results were on HIV counselling and testing client cards.

3.9.1 Questionnaire

The participants eligible as per the inclusion criteria were recruited from the labor suite and postnatal room, maternity ward, Kampala international University Teaching Hospital. Recruitment was by the principal investigator. In order to maintain confidentiality a private side room allocated for the study was used. General information regarding the research was explained to each of the participant and the specific information that required further elaboration was done through education and counseling of the participants.

Those who accepted, were consented by the principal investigator and then the participants signed the first part of the consent form which was consent to study. The participants were interviewed using a pre-tested questionnaire to obtain data on demographic factors like age, their level of education, marital status and religion, and family-social factors like knowledge of partners Human Immunodeficiency Virus (HIV) status decision making as regards HIV testing, fear of testing and if a positive test result would bring about marital disharmony, condom use in pregnancy if spouse was infected with HIV and their knowledge of HIV transmission and their views on mother to child transmission of Human Immunodeficiency Virus and their source of information regarding HIV and PMTCT. Finally the questionnaire also sought to find out the number of antenatal visits the participants had attended. Therefore at the end of filling up of the questionnaire, information describing the factors associated with missed opportunities for HIV testing was obtained.

3.9.2 HIV counselling and testing client card forms.

These forms were used to fill the HIV test results of the eligible women. The results were documented with a tick as either negative or positive depending on the woman's HIV infection status.

3.10 Data collection procedures

Human Immunodeficiency Virus testing began by a pre-test counseling by a trained counsellor followed by signing the second part of the informed consent which was consent to testing. The results were then interpreted to the patient and recorded. This was followed up by a post-test

counselling the content of which depended on the mother's results: that was, post-test counselling for HIV positive patient or a post-test counselling for HIV negative patient. Both the pre-test and post-test counselling sheet were available in the appendix V.

Human Immunodeficiency Virus (HIV) test was performed using rapid tests via a needle prick on the participant's index finger. The *Determine® HIV1/2 test kits (Abbott Laboratories, Illinois USA) were used as a screening test and Stat-Pak® (Chembio Diagnostic Systems, Inc., New York, USA) screening test, was used to confirm the positive Determine® test for those who seroconverted. Indeterminate results were verified by a tie-breaker, Uni Gold™ Recombigen (Trinity Biotech, Ireland) HIV Rapid test.

The three tests were performed as per the illustrations provided in the appendix seven (VII). The results were then released to the participant who were counseled accordingly. Those who were found to be HIV positive in latent phase were counseled on Elimination Mother to Child Transmission interventions that could be carried out in labor with measures to institute them immediately. Option B plus which is a fixed dose combination of Tenofovir, Lamivudine and Efavirence, was administered immediately to the woman. After delivery Nevirapine was calculated according to the birth weight of the neonate and administered. They were then linked up immediately to CHAI Clinic for further counselling and testing and long term follow-up upon discharge for continued optimal health care.Those who tested negative underwent a post-test counselling and to encourage them to retest even during the breastfeeding period..

3.11 Data quality control

Inclusion and exclusion criteria was strictly adhered to. A common pretested questionnaire was used. The principle researcher supervised the procedure and ensured that questionnaires were filled completely before collection to ensure valid data was obtained. A senior specialist in the department supervised the procedure after every 20 patients to ensure protocol was adhered to.

The Human Immunodeficiency Virus testing kits were also assessed to ensure reliability and validity and were subjected to three phases of quality control. For the pre-analytical quality control the kits' expiry dates were confirmed and their storage as per the manufacturers instructions. The source of the specimen was a finger prick and the type of specimen was whole blood. In the analytical phase the standard operating procedure manual for performing the test were followed. Each rapid tests' internal quality control was verified by the principal

investigator. Blood sample for every twentieth patients was retested in an independent laboratory in Ishaka Adventist Hospital and was counterchecked whether or not they corresponded with the results obtained using the HIV testing kits being used by the investigator for external quality control. For the post analytical phase, the results were interpreted as per the user manual and the results were transcribed with the correct identifier code as reactive (R) or non-reactive (NR). The results were then reported and interpreted to the individual and the data was then entered into the maternity registry (hard copy) to maintain the record and the copy of the HCT result form given to the patient.

3.12 Data processing

The responses were coded in Excel software using edit command, and then exported into STATA version 13.0 for data analysis.

3.13 Data analysis

The dataset was imported into STATA software version 13·0 for analysis. Sociodemographics, obstetrics and HIV knowledge factors were described using means or median for continuous variables and proportions for categorical variables, and presented in a table.

Objective 1: This was calculated as a proportion of mothers with missed opportunity for HIV testing out of all mothers enrolled into the study, and expressed as a percentage with its corresponding 95% confidence interval (CI). The prevalence of missed opportunity for HIV testing was also calculated for each age category and comparisons made using Chi-square test.

Objective 2: This was calculated as a proportion of mothers with a positive HIV result out of all the mothers with missed opportunity for HIV testing enrolled in the study, and expressed as a percentage.

Objective 3: A binary variable of missed opportunities for HIV testing was used as the dependent variable coded 0=No and 1= yes. All maternal factors were used as independent variables in this analysis. In Univariate analysis, based on both Chi-square test and Logistic regression, repeated analysis comparing each maternal characteristic with missed opportunity for HIV testing was done. Unadjusted odds ratios with their corresponding 95% CI were reported. A variable was considered significant in this analysis if it has a $p<0.05$.

All factors with p-value <0·1 were considered in the multivariate analysis which was performed so as to control confounding. Assumptions for use of multiple logistic regression, e·g the absence of multicollinearity among the independent variables, was explored. A manual back-ward and stepwise selection method was used in establishing the final multivariate analysis model with maternal factors that bear an independent significant association with missed opportunity for HIV testing. In this method, we excluded variables that loses their meaningful association with missed opportunity for HIV testing after controlling for the effect of other variables in the model. The goodness-of-fit test was performed on the final model so as to assess its quality.

The maternal factors in the final multivariate model were then reported together with their adjusted odds ratios and 95% confidence intervals. A variable was considered significant in this analysis if it has a $p<0.05$.

3.14 Ethical considerations

3.14.1 Informed consent and respect for participants

Voluntary recruitment was done and an informed consent was signed. Informed consent from participants was obtained after fully explaining the details of the study to them in English and local languages. To mitigate possible social harm from partners, women were required to report whether they had any objections to testing for HIV from husbands/partners as part of the consent process for HIV testing (see copy attached at Appendix I and II). Emancipated minors did not require presence of their guardians to consent to participate in the study but were required the approval of their guardians to test for HIV to avert any potential social harm. Participants were not forced to enroll themselves if they did not want to. Participant were free to withdraw from the study any time they wished without coercion or compromise of care they were entitled to.

3.14.2 Risks and Benefits

Mothers who had missed out on the opportunity for HIV testing benefited by getting to know their HIV infection status and this was likely to motivate the spouses/partners to test too. For the couples that turned out to be HIV negative, this study made them aware of the importance of HIV testing in pregnancy, emphasized the implication of missed opportunity and the risk that it posed to their unborn child. The awareness created has a potential to help them actively seek HIV testing in their future pregnancies. Also, for those who turned out negative, post-test

counselling given included advice on retesting in pueperium as they are still at risk and vulnerable to infection.

For those who turned out to be positive, they also benefited by knowing their HIV status and their unborn child benefited by having their mother undergo intrapartum intervention to try and eliminate transmission to them. The couple also benefited in that they was linked to follow-up HIV clinics for further management and their ounselling focused on issues of breastfeeding, safer sex practices, follow-up and treatment.

HIV infections have profound implications on family, social and health issues once the diagnosis has been made. This was reduced by involving the male partners either in person through counselling for those who were around or verbally through a phonecall to obtain consent.

3.14.3 Confidentiality and secrecy

Confidentiality of participants was ensured by using dummy numbers on questionnaires and codes to identify participant's results whether they turn out positive or negative for HIV antibodies were used. The codes are internationally recognized i.e. TR was used for those who turn out negative and TRR for those who turn out positive.

As Uganda HIV Prevention Act, 2014 requires mandatory involvement of the spouse/partner when testing pregnant women. Confidentiality was extended to the spouses or partners of those women who were able to involve their husbands by seeking approval before testing. After testing the women were then encouraged to disclose their results to their spouses or partners and the guardians of emancipated minors. (Ugandan HIV Prevention and Control Act, 2014). Details of participants were kepted under lock and key for privacy and confidentiality purposes throughout the course of the study. There was limited access of data to non-research members and other clinicians not involved in the study.

3.14.4 Selection of participants

Recruitment of eligible participants was done consecutively after voluntary acceptance and a consent form was signed. Each research participant was handled as an individual with uttermost respect for her and was free to withdraw from the study anytime she wishes without any compromise of care given there after. The principle investigator when recruiting participants into the study did not put on a clinical coat and used separate room in maternity ward and recruited

the eligible candidates after initial clinical management was instituted by another doctor in the department so as to prevent the principle investigator's position of being a Doctor in the same department influence recruitment of participants into the study.

3.14.5 Community Involvement

Our study findings will be communicated to the head of department of Obstetrics and Gynecology in Kamapala International University Teaching Hospital and the Hospital Library as a form of feedback as well as Bushenyi Municipality Health Office.

3.14.6 Approval Procedure

Approval to carry out the study was sought from the department of Obstetrics and Gynecology, the Faculty and the post graduate school as well as from the Institutional Research and Ethics committee of Kampala International University. The approval letter was presented to the hospital administration and consent/permission was sought from the administration of the hospital before the study was carried out.

3.14.7 Incentives and Re-imbursement

Maximal ethical norms were adhered to for the participants. No form of coercion or any other form of incentives were offered to them but compensation and reimbursement was offered where applicable.

3.15 Dissemination of Results

The final report will be submitted to the department of obstetrics and gynaecology as well as the University Library, Post graduate Directorate and District health officer and the hospital administration.

The manuscript will be submitted for publication by end of November through Clinical Gynaecology- Journal-Elsevier (www.journal.elsevier.com)

CHAPTER FOUR

PRESENTATION AND INTERPRETATION OF RESULTS

4.1 Social demographic, obstetric and knowledge and awareness about HIV characteristics of study participants

4.1.1 Table 1: Socio-demographic characteristics of study participation

VARIABLE	SUMMARY MEASURES (%)
Age	
> 25	117 (53.7)
25-34	76 (34.9)
35-48	25 (11.4)
Median age (iqr)	24 (21-29)
Education (n %)	
None	6 (2.8)
Primary	94 (43.1)
Secondary	82 (37.6)
Tertiary	36 (16.5)
Religion	
Christian	197 (90.4)
Muslim	16 (7.3)
Other	5 (2.3)
Marital status	
Married	206 (94.5)
Single	12 (5.5)
Tribe	
Munyankole	186 (85.3)
Mukiga	16 (7.3)
Mutoro	3 (1.4)
Others	13 (6.0)
Ocupation	
Civil servants	23 (10.6)
Self employed	103 (47.2)
Others	92 (42.2)

Majority of the study population were less than 25 years of age with the median age of participants at 24 years (IQR) with the lower quartile of 21 years and upper quartile of 29 years. Over 90% of the study participation were Christians.The majority of the study participants, 94% had received primary education. Over 94% of the study participants were married. Majority of the study participants belonged to the Munyankole tribe and 47% of the participants were self-employed as shown in table 1.

4.1.2 Table 2: Obstetric characteristics of study participants

Variable	SUMMARY MEASURES (%)
Parity	
Nulliparous	93 (42.7)
Primiparous	41 (18.8)
Multiparous	72 (33.0)
Grand Multiparous	12 (5.5)
Gestational age during Labour	
Preterm Pregnancy	41 (18.8)
Term Pregnancy	177 (81.2)
ANC clinic attendance	
Did not attend	3 (1.4)
Attended	215 (98.6)
Received counseling prior to HIV testing among those who attended ANC clinic	215 (100.00)
Received counseling after hiv testing among those who attended ANC clinic	
No	206 (95.8)
Yes	9 (4.2)
Mean ANC attendance (S.D)	4 (1.2)

Majority of the study participants, 43% were nulliparous at time of admission in maternity ward and over 81% had reached term pregnancy. Antenatal care clinic (ANC) attendance was attended at least by the majority 99% of the study participants. All the study participants, among those who attended ANC clinic and over 95% of those who were counseled and tested for Human Immunodeficiency Virus (HIV) during ANC clinic did not receive post – HIV testing counseling after being tested as shown in table 2.

4.1.3 Table 3: Knowledge and awareness about HIV characteristics of study participants

VARIABLE	SUMMARY MEASURES (%)
Mothers who were aware about HIV/AIDS	218 (100.00)
Knowledge of partners/spouses HIV infection status	
No	50 (22.9)
Yes	168 (77.1)
Knowledge that pregnant women were also at risk	
No	2 (0.90)
Yes	216 (99.1)
Knowledge of blood and blood products as a route of acquiring HIV infection	
No	76 (35.2)
Yes	140 (64.8)
Knowledge of MTCT during pregnancy	
No	14 (6.5)
Yes	202 (93.5)
Knowledge of MTCT during breast feeding	
No	53 (24.5)
Yes	163 (75.5)
Source of information	
ANC	
No	186 (85.3)
Yes	32 (14.7)
Village health team	
No	71 (32.6)
Yes	147 (67.4)
Decision making	
Mother and spouse	72 (33.0)
Mother alone	146 (67.0)
Positive HIV result could lead to marital disharmony	
No	58 (26.6)
Yes	160 (73.4)
Reasons for missed opportunities for HIV testing	
No time	17 (70.8)
I don't know	6 (25.0)
Others	1 (4.2)

The study population had knowledge about Human Immunodeficiency Virus (HIV) infection. More than 70% of the women had knowledge of partners or spouses HIV status. More than 90% of mothers had the knowledge that they were at risk of acquiring HIV infection during pregnancy. More than 90% had knowledge that mother to child transimission can occur during pregnancy, 60% during labor, 75% during breastfeeding and all the mothers had knowledge that MTCT can be prevented. More than 80% of the mothers denied ANC and Voluntary Conselling and Testing centres (VCT) as a source of information regarding HIV transimission and more than 65% reported that they had obtained the knowledge from Village Health Teams (VHT). More than 70% of mothers had knowledge about their spouses' or partners' HIV status and more than 90% were allowed to test without their husbands' approval. Majority of the mothers, 67% were left alone in decision making as regards HIV testing and more than 70% of women said that a positive HIV test results could bring about marital disharmony. Among those who had missed opportunities for HIV testing, 70% said they had "no time", 25% said "they did not know why" they were not tested and 4% gave other reasons like they thought the pregnancy was still small for them to attend ANC.

4.2 The overall prevalence and age specific prevalence of missed opportunities for HIV testing among mothers delivering at KIUTH

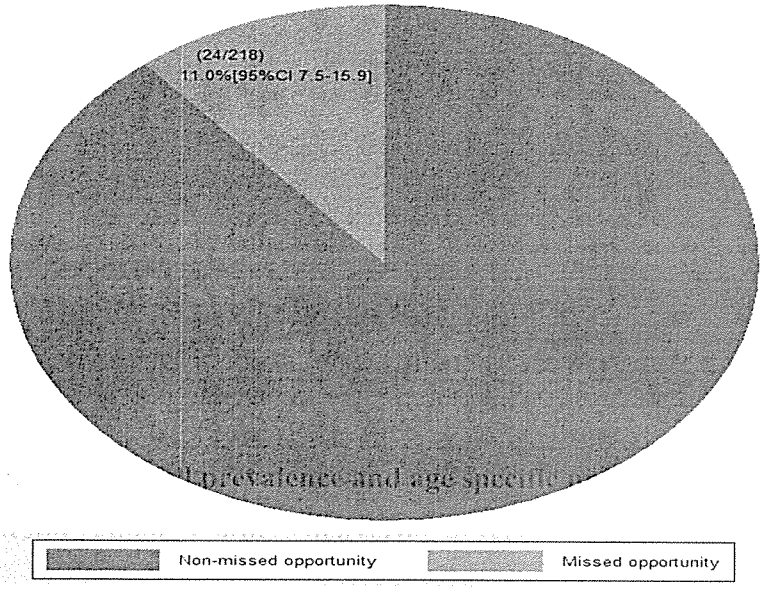


Figure 1: A Pie chart showing the overall prevalence of missed opportunities for HIV testing among mothers delivering at KIUTH

Table 4: The age specific prevalence

PREVALENCE TYPE	N	FREQUENCY (n)	% [95% CI]	P. Value
Age – specific Prevalence of missed opportunities	218			**0.040**
< 25	117	7	6.03 [2.90 – 11.24]	
25 – 34	76	13	17.11 [10.1 – 27.54]	
35 – 48	25	4	16.00 [5.70 – 37.54]	

From a total sample size of 218 recruited participants, 24 were found to have missed opportunity for Human Immunodeficiency Virus testing upon admission in maternity ward labor suite. The overall prevalence was at 11% with 95% confidence that the true proportion of missed opportunity ranges from 7.5 to 15.9% as shown in table 4 below. For age-specific prevalence, the prevalence was 6% (n = 7) among those less than 25 years of age, 17% (n =13) among those between 25 years to 35 years and 16% (n =4) among those between 35 years to 45 years. This study was statistically significant (p value of 0.040) as this showed that prevalence of missed opportunities to HIV testing increased with age as shown in table 4.

4.3 Table 5: The prevalence of HIV Seropositive results among mothers with missed opportunity for HIV testing and are delivery in KIUTH

HIV RESULT	N	FREQUENCY	PERCENTAGE	95% CI
Negative Result	24	23	95.8	72.6 – 99.5
Positive Result	24	1	4.2	0.5 – 27.4

From a total of 24 participants who had missed opportunities for HIV testing, one tested positive for HIV infection. Therefore, the prevalence of HIV seropositive result was 4.2% with 95% confidence that the true proportion of HIV positive result ranges from 0.5 – 27.4% as shown in table 5.

4.4 Table 6: Bivariate analysis of factors associated with missed opportunities for HIV testing among women delivery at KIUTH

VARIABLE	OPPORTUNITY NOT MISSED n= 194 (%)	OPPORTUNITY MISSED n= 24 (%)	cOR 95% CI	P. Value
Age categories				
25 – 34	63 (82.9)	13 (17.1)	3.21 (1.22 – 8.47)	**0.018**
35 – 48	21 (84.0)	4 (16.0)	2.97 (0.80 – 11.04)	0.105
Parity at presentation				
Nulliparous	91 (97.6)	2 (2.2)	1.00	
Primiparous	37 (90.2)	4 (9.8)	4.92 (0.86 – 28.02)	0.073
Multiparous	56 (77.8)	16 (22.2)	13.00 (2.88– 58.68)	**0.001**
Grand Multiparous	10 (83.3)	2 (16.7)	0.022 (0.01 – 0.09)	**0.036**
Knowledge of blood and blood products				
No	36 (73.5)	13 (26.5)	5.19 (2.15 – 12.51)	**<0.001**
Knowledge about spouses/ partners HIV status				
No	36 (72.0)	14 (28.0)	6.14 (2.53 – 14.94)	**<0.001**
Decision making				
Mother alone	124 (84.9)	22 (15.1)	6.20 (1.41 – 27.19)	**0.015**

Mothers belonging to the age group between 25 years – 35 years of age were 3 times more likely to have missed opportunities for HIV testing compared to mothers who were less than 25 years of age and thus, was statistically significant cOR = 3.21, 95% CI 1.22-8.47. Order of increasing parity at time of admission also bared statistical significance with the multiparous mothers being 13 times more likely to have missed opportunities to HIV testing as compared to the nulliparous mothers and this was significant cOR = 13.00, 95% CI 2.88 – 58.68. Grand multiparous mothers on the hand were 9 times more likely to have missed opportunities for HIV testing as compared to the nulliparous mothers and this was statistically significant cOR = 9.10, 95% CI 1.15 – 7.81. Mothers who had no knowledge that HIV/AIDS could be transmitted through blood and blood products were more likely to have missed opportunities for HIV testing as compared to Mothers who had no knowledge and this was statistically significant cOR = 5.19, 95% CI 2.15 – 12.51. Mothers who had knowledge about spouses/partners HIV infection status were 6 times more likely to have missed opportunities for HIV testing as compared to Mothers who knew their spouses/partners HIV/AIDS status and this was significant cOR = 6.14, 95% CI 2.53 – 14.94. Mother who had no knowledge about spouse/partners' HIV infection status and whose spouses/partners were not involdved in decision making as regards HIV testing were six times more likely to miss out on HIV testing as compared to those who knew and those whose spouses were involve din decision making and this was statistically significant as shown in table 6.

4.5 Table 7: Multivariate analysis of factors associated with missed opportunities for HIV testing among women delivery at KIUTH

VARIABLE	aOR	95% CI	P. Value
PARITY			
Nulliparous	1.00		
Primiparous	4.86	0.77 – 30.74	0.093
Multiparous	17.01	3.34 – 86.66	**0.001**
Grand Multiparous	10.71	1.07 – 106.99	**0.043**
Marital disharmony when tested positive	1.00		
No marital disharmony when tested positive	16.93	5.55 – 51.64	**<0.001**
Did not obtain PMTCT information from V.H.T	1.00		
Obtained PMTCT information from V.H.T	4.28	1.16 – 15.82	**0.029**

Upon Multivariate analysis as shown in table 7 above maternal parity, whether or not a positive HIV test result would cause marital disharmony and having the village health team as source of information as regards modes of HIV/AIDS transmission were assessed for their association with missed opportunities for HIV testing.

As regards parity, multiparous women were 17imes more likely to have missed opportunities to HIV testing as compared to nulliparous mothers at the time of admission and this was satisfactory significant aOR = 17.01, 95% CI 3.34 – 86.66. Grand multiparous mothers were 10 times more likely to have missed opportunities for HIV testing as compared to nulliparous mothers and this was significant aOR = 10.71, 95% CI 1.07 – 106.99.

Mothers who did not fear that marital disharmony would occur if they happened to have a positive HIV test result were 17 times more likely to have missed opportunities for HIV testing as compared to mothers who said that marital disharmony would not occur if they happen to test positive for HIV and this was significant aOR = 16.93, 95% CI 5.55 – 51.64.

Mothers who said that they obtained their information regarding models of HIV/AIDS transmission from village health team were 4 times more likely to have missed opportunities for HIV testing as compared to mothers who did not obtain this information from VHT and this significant aOR = 4.28, 95% CI 1.16 – 15.82.

CHAPTER FIVE
DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

To identify Human Immunodeficiency Virus (HIV) positive pregnant women is pivotal in virtual Elimination of Mother to Child Transmission (EMTCT). This chapter presents a discussion on key findings from this research. Generally, the findings depicted that missed opportunities for HIV testing do occur in a world that is fast moving towards EMTCT

5.1 Discussion

5.1.1 The overall prevalence and age specific prevalence of missed opportunities for HIV testing among mothers' delivery in KIUTH

The overall prevalence in the study was found to be 11% (95% confidence that the proportion of missed opportunities for Human Immunodeficiency Virus (HIV) testing ranges from 7.5% to 15.9%). In sub-Saharan Africa, only 35% of pregnant women underwent testing for HIV during the year 2010, (Ministry of Health Uganda, 2018) this implies that less than 60% of pregnant women are not tested. Several studies have been carried out to try to find out the number of pregnant women not tested for HIV to highlight missed opportunities for HIV testing as a possible negative force towards achieving universal elimination of mother to child transmission.The prevalence of 11% obtained was comparable to 14% obtained in South Africa by Theron G. B. *et al.*, (2014) and 9% obtained in Swaziland by Kieffer MP *et al.*, (2011)

In East Africa, the prevalence of 11% obtained in this study greatly differed from the prevalence of 58% obtained in Western Kenya (Rogers *et al.*, 2016). The two prevalence in this study could be explained by the fact that the study was done over a short duration of time (3 months) as compared to the 4 year study done in Western Uganda.

The prevalence of 11% obtained in the study was dissimilar to the prevalence of 27.1% obtained in 2006 by Ononge *et al.* (2014). This could be explained by the fact that this study was carried out for more than 10 years after implementation of routine HIV testing and counseling in the country as compared to carrying out the study when implementation of routine HIV testing and counselling was just beginning. Another explanation could be that this study is done in a hospital setup that conducts on average 10 deliveries per day as compared to 80 deliveries in 1 day at

Mulago Hospital. A final explanation as to why the low prevalence could also be due to the fact that the current study's eligibility criteria for postterm mothers was only extended up to 24 hours hence a smaller sample size; while the other study extended their eligibility criteria to include mothers up to 72 hours post-delivery and therefore a larger sample size.

The other study done in Uganda with a slightly similar prevalence of 7.9 % by Namara-Lugolobi *et al.*(2017) when women with no documented HIV status were included in eligibility criteria a similar criteria used by this current study was carried out in the same hospital but, in the year of 2013.

Statistically significant associations between age and HIV testing have been shown by several studies. In the study Statistically significant associations (P value = 0.040) between older age and having missed opportunities to HIV testing was observed, as mother 25 years and older had missed opportunities to HIV testing as compared to mothers less than 25 years of age.

This is similar to a study done in Uganda where there was a significant association P.Value = 0.0002 between age and having missed opportunities for HIV testing. In that study the older mothers tended to have more missed opportunities to HIV testing as compared to the younger mothers (Gunn *et al.*, 2016).

The finding in this current study was dissimilar to the finding in the study done in Nigeria where missed opportunities for HIV testing was higher in the younger age group as compared to the older age groups (Gunn *et al.*, 2016). This can be explained by the fact that the young mothers were either nulliparous or primiparous and were closely following up on their pregnancy as compared to the multiparous women of older age group (Were *et al.*, 2013).

5.1.2 The prevalence of HIV seropositive results among the mothers' with missed opportunities for HIV testing among women delivering in KIUTH

The prevalence of Human Immunodeficiency Virus (HIV) seropositive results in this study was found to be 4.2%. The prevalence is also an HIV seroconversion prevalence in the study as the participant was HIV negative before.The seroconversion prevalence thus obtained is similar to some prevalence obtained in Sub-Saharan Africa like 3% obtained in Uganda by Moodley *et al*, (2009); 4% obtained by Kieffer *et al.*, (2011) and similar to the prevalence of 5.3% obtained in Tanzania Mbena *et al*, (2014). This seroconversion prevalence of 4.2% obtained in this study

contradicts the ones of 1.5% obtained in Kenya (Rogers *et al.*, 2017). This higher prevalence could probably be explained by the following. First, the false sense of security perceived by > 75% study participants since they knew their partners HIV status as negative not knowing that their spouses or partners were themselves at risk of HIV infection and therefore could be a potential source of infection to them as also found (Schacht *et al.*, 2014).

Secondly, the increased prevalence of seroconversion as observed here could be explained by the lack of heightened Human Immunodeficiency Virus (HIV) risk perception which could be brought about by the fact that > 95% of our study participants did not receive HIV tests counseling once they had their negative results explained to them. Among the things counseled and explained to the parties include information on HIV prevention and HIV/STI risk reduction, disclosure to the window period and encourage and all this encorages the mothers to retest three months after the test done. All of this information is important to heighten the mothers HIV perception risk to her.

Lack of heightened Human Immunodeficiency Virus (HIV) risk perception in the study could also be as a result of the source of information on Prevention of Mother to Child Transmission (PMTCT). Antenatal clinics (ANC) are an important source of comprehensive knowledge of HIV to pregnant women attending clinic, yet more than 80% of study participants did not mention ANC as their source of information about HIV transmission. This study finding was also similar to a study done in Nigeria where more than half of the pregnant mothers did not mention hospital as their first source of information as regards HIV but mentioned the media, friends and neighbor as their source of information (Balogun & Owoaje, 2016).

5.1.3 Factors associated with missed opportunities to HIV testing among women delivering in KIUTH

Of the factors that were examined on multivariate analysis regarding occurrence of missed opportunity for detection of HIV, the following factors were statistically relevant and opens the up floor of discussion. Uganda is one of the countries with the highest fertility rates 6.7 in the world (Pariyo *et al.*, 2012) this only means more pregnancies per woman. In this study HIV testing among women was negatively associated with parity. Multiparity was found to be a significant factor as far as missing the opportunity to detect HIV is concerned when compared to the nulliparous mothers and the primiparous mothers. Multiparous women were 17 times at risk

of missing detection of HIV in pregnancy compared to nulliparous women. The study finding is not in agreement with the finding in Kenya where parity was not significantly associated with missed opportunity to detect HIV infection in pregnancy (Anna J Rogers *et al.*, 2017).

The reasons for this finding are thought to be the following; in this study majority of the multiparous women said they had "no time" to attend ANC as they were busy taking care of family and were working as 48% of the study participants were self-employed. This was also similar to other studies where multiparous women stated that they were too busy to attend ANC as found by Boerleider *et al.*, (2013) and in south-western Nigeria 31% of the women said they were too busy to attend (Bo & Ob, 2017).

Multiparous women are more accustomed to pregnancy therefore tend to have less concern about monitoring their pregnancy. Nulliparous women are unaccustomed to pregnancy experience so are either excited about pregnancy or anxious leading them to seek ANC as prescribed to get advice and assistance (Were *et al.*, 2013). This could then lead to multiparous having missed opportunity for HIV detection.

The presumed knowledge of multiparous women about services offered at ANC is supposedly high compared to that of the nulliparous, so the nulliparous women show up for ANC regularly unlike the multiparous women who tend to come late for ANC or even in labour hence missing the opportunity for timely detection of possible HIV infection in pregnancy. Multiparous women might also be less motivated to test again, Pariyo *et al.*, (2012) especially when the previous pregnancies have had a negative HIV test result.

However, this study finding contradicts Pariyo *et al.*, (2012) where multiparity was not associated with having missed opportunities for HIV testing. Education level and social-economic status strongly influenced these multiparous women to not miss out on HIV testing (Pariyo *et al.*, (2012).

Village health team (VHT) are the lay helpers who make it possible for certain health services to go beyond the health centre and into the community. This has been made evident by the fact that most of the mothers in this study said they had obtained their knowledge as regards Human Immunodeficiency Virus (HIV) testing and Prevention of Mother to Child Transmission (PMTCT) through the VHT. Surprisingly most of the pregnant mothers in this study (75%) who

got their information regarding HIV infection from VHTs were four times more likely to have missed opportunity for HIV testing as compared to those who did not get their information from VHTs and this is statistically significant. This relationship is probably because the VHT are less informed about the thorough details of HIV transmission and the latency period. It is also possible that they do not have refresher courses about updates on HIV screening protocols among pregnant women. This was also similar to a study that was done in Gulu, Uganda where the VHTs had inadequate skills coupled with inadequate refresher courses to help them improve eventually making them less effective (Kimbugwe *et al.*, 2015). This finding is in agreement with the Ministry of Health (MOH), Uganda which after conducting a comprehensive national assessment of VHT identified inadequate skills and training of the VHT among the challenges that needed to be addressed (Ministry of Health Uganda, 2018). Currently the MOH has recommended establishment of a new strategy for community extensive workers in Uganda which will be formally institutionalized in the local government structure making them accountable to the government unlike VHT who are not accountable.

However, this finding differed from a study done in Uganda where increased HIV testing (80%) was observed among study paricipants who were counselled about HIV and PMTCT by the village VHTs. This is after the VHTs had refresher courses with supervised practicum. The study participants had increased HIV retesting uptake as they recalled that the VHTs had advised them about the importance of retesting (Wamala-mucheri *et al.*, 2016).

The third factor that was identified in this study is the opinion of a positive HIV test not causing marital disharmony /problems which occurred to the majority (>70%) of the women. It is associated with a 17 times risk of missing opportunity to detect HIV in pregnancy compared to those women who perceive a positive HIV test as a risk to marital disharmony.This finding is thought to be a result of laxity with testing among those who think of HIV test result as inconsequential towards their marriages so they end up not bothering about HIV testing even during pregnancy.

This could also be explained by lack of knowledge about PMTCT causing them not to understand the importance of HIV testing during pregnancy that the importance is in PMTCT and this goes beyond marital connections. Another possible reason in this study is reporting bias may be they already knew their partners HIV status as positive even though they reported that

their partner were negative for HIV infection. Reporting bias has been reported in several studies for example in a study by Schacht C *et al.,* (2014), where majority of the patients who ended up seroconverting had reported that their spouses were negative (Schacht C *et al.,* 2014).

This finding is not in agreement with the study carried out in Geita district, Northwest Tanzania, which found that Significant challenges identified that compromised services at ANC clinics including HIV testing was fear of HIV testing among others (Konje *et al.*, 2018). The findings of this current study is also not in agreement with a study done in Kenya which showed that because a pregnant mother is usually the first to be tested for HIV in the family she may be blamed for unfaithfulness by the spouse. This made 32% of the mothers anticipate rejection by their spouse and therefore feared to test (Miller & Cohen, 2011).

However, these women who fear that a positive Human Immunodeficiency Virus test may spoil their marriage are expected to also get concerned about the HIV status of their spouse and not theirs only so they can prevent HIV transmission during pregnancy. Those women who don't attach any socio-marital consequences to a positive HIV test may not even consider knowing their spouses status and that they could probably acquire the HIV infection from their spouses later on in pregnancy and eventually transmit it to their unborn child..

The Uganda Prevention of Mother to Child Transmission (PMTCT) guidelines states that all pregnant mothers should be counselled for Human Immunodefiency Virus testing when they attend atenatal clinic (Pariyo *et al.*, 2012). Counselling therefore should not only be the one given before testing for the sake of obtaining consent but a post test counselling should be equally given, the contents of which differ according the patient's results. Counselling a mother after a negative HIV test is a very important tool in PMTCT as it advises the HIV negative mother on ways to maintain her negative state. This is very important in that it can help empower the woman and reduce incident HIV infection and seroconversion. More than 90% of the mothers in this study denied receiving post HIV test counselling and this only suggests that antenatal clinics give significant attention to women who test positive as compared to the women who test negative (Kieffer MP *et al.*, 2011).

5.2 Strength and weaknesses

5.2.1 Strengths

The study was instrumental in reflecting the status of HIV testing during antenatal period and it brought into focus several variables that negatively influenced HIV testing during antenatal period.

It was anticpated that some women might refuse to test for HIV but this was not the case as all mothers consented with approval from their spouses after proper counselling so no mother who had missed opportunities for HIV testing actually missed to get to know their HIV status. This study showed that rapid HIV stesting in labor suites is feasible, accurate and timely. (W.H.O, 2017).

5.2.2 Weaknesses

The study was done in a hospital setting and might not really reflect what is in the community. It was difficult to determine whether the seroconversion that occurred due to a new infection or true seroconversion following a window period. It was not possible to test the spouse of the women who seroconverted to rule out or confirm serodiscordant couple but it was ensured that they were linked to HIV clinic for further couple counselling, treatment and long term follow up of the family.

5.3 Conclusions

- A significant proportion, 11% of mothers who delivered in KIUTH during the study period were found to actually have missed opportunities to HIV testing.
- There is evidence of seroconversion and this can accentuate mother to child transmission due to increased viremia especially during this period of seroconversion.
- Parity, obtaining MTCT information from village health team and mothers who don't attach any socio-marital consequences to a positive HIV test result are significant factors contributing to missed opportunities for HIV testing.

5.4 Recommendations

- Sensitizing the medical personnel about importance of identifying mothers with missed opportunities for HIV testing during labour and this study has shown that even in labour women can accept to be tested for HIV.

- To sensitize ANC staff about adequate and effective post HIV test counselling to women who are found negative for HIV so as increase their perception of being at risk to HIV infection to help educate these women on ways of HIV prevention.
- Stronger analytical study designs with optimized number of participants are needed to help us understand more about parity, the role of village health team and mothers who don't attach any socio-marital consequences to a positive HIV test result and their associations with missed opportunities.

REFERENCES

AIDS info. (2015). Preventing Mother-to-Child Transmission of HIV after Birth. Retrieved from https://aidsinfo.nih.gov/understanding-hiv-aids/fact-sheets/20/50/preventing-mother-to-child-transmission-of-hiv-after-birth.

Baker, U., Okuga, M., Waiswa, P., Manzi, F., Peterson, S., & Hanson, C. (2015). International Journal of Gynecology and Obstetrics Bottlenecks in the implementation of essential screening tests in antenatal care : Syphilis , HIV , and anemia testing in rural Tanzania and Uganda. *International Journal of Gynecology and Obstetrics*, *130*: S43–S50. https://doi.org/10.1016/j.ijgo.2015.04.017

Balogun, F. M., & Owoaje, E. T. (2016). Perception about the "Opt Out Strategy" for HIV Testing and Counselling among Pregnant Women attending Antenatal Clinic in Ibadan, Nigeria. *Journal of Community Medicine and Primary Health Care*, *28*(1), 45–51. https://www.ajol.info/index.php/jcmphc/artical/view/139406.

Bo, O., & Ob, A. (2017). Knowledge and Attitude of Women and Its Influence on Antenatal Care Attendance in Southwestern Nigeria, *4*(2). https://www.anexpublishers.co/articals/JNH/4207-knowledge-and-attitude-of-women-and-its-influence-on-antanatal-care-atendance-in-southwestern-Nigeria.pdf

Boerleider, A. W., Wiegers, T. A., Manniën, J., Francke, A. L., & Devillé, W. L. J. M. (2013). Factors affecting the use of prenatal care by non-western women in industrialized western countries : a systematic review. https://doi.org/10.1186/1471-2393-13-81

Camlin, C. S., Ssemmondo, E., Chamie, G., Ayadi, A. M. El, Sang, N., Kabami, J., … Francisco, S. (2018). HHS Public Access, *28*(Suppl 3), 67–73. https://doi.org/10.1080/09540121.2016.1164806.Men

Davison, C., Holland, F., Newell, M., Hudson, C., & CS Peckham. (2007). Screening for HIV infection in pregnancy. *AIDS Care*, *5*(2): 135–140 6p. https://doi.org/10.1080/09540129308258593

Deblonde, J., Petra De Koker, Franc, F. Hamers, Johann, F., Luchters, S., Marleen Temmerman, (2018). Barriers to HIV testing in Europe : a systematic review. *European Journal of Public Health, 20*(4): 422–432. https://doi.org/10.1093/eurpub/ckp231.

Dehghanifirouzabadi, & Qobadi. (2015). AIDS & Clinical Research Unknown Human Immunodeficiency Virus Status and Associated Risk Factors among Pregnant Women in the United States : Findings from the 2013 Behavior Risk Factors Surveillance System.

Journal of AIDS & Clinical Research., 6:516. https://doi.org/10.4172/2155-6113.1000516

Drake AL, Wagner A, Richardson B, John-Stewart G. Incident HIV during pregnancy and postpartum and risk of mother-to-child HIV transmission: a systematic review Publication: Bulletin of the World Health Organization; Type: Research Article ID: BLT.17.203265 Page 12 of 18 and meta-analysis. PLoS Med. 2014 02 25;11(2):e1001608. https://doi.org/10.1371/journal.pmed.1001608 PMID:24586123

Druce and Nolan. (2007). Seizing the Big Missed Opportunity: Linking HIV and Maternity Care Services in Sub-Saharan Africa. *Reproductive Health Matters, 15, 190–201.* https://doi:10.2471/BLT.08.059279

Galiwango, R. M., Musoke, R., Lubyayi, L., Ssekubugu, R., Kalibbala, S., Ssekweyama, V., Kigozi, G. (2013). Evaluation of current rapid HIV test algorithms in Rakai, Uganda. *Journal of Virological Methods, 192*(0): 25–27. https://doi.org/10.1016/j.jviromet.2013.04.003

Gunn, J. K. L., Asaolu, I. O., Gibson, S. J., Wightman, P., Ezeanolue, E. E., & Ehiri, J. E. (2016). Antenatal care and uptake of HIV testing among pregnant women in sub-Saharan Africa : a cross-sectional study.

Heemelaar, S., Habets, N., Makukula, Z., Roosmalen, J. Van, & Akker, T. Van Den. (2015a). Repeat HIV testing during pregnancy and delivery : Missed opportunities in a rural district hospital in Zambia. *Trop Med Int Health; 20*(3): 277–283. https://doi.org/10.1111/tmi.12432

Heemelaar *et al.* (2015b). Repeat HIV testing during pregnancy and delivery: Missed opportunities in a rural district hospital in Zambia. *Tropical Medicine and International Health, 20*(3): 277–283. https://doi.org/10.1111/tmi.12432

Jamieson *et al.* (2007). Rapid human immunodeficiency virus-1 testing on labor and delivery in 17 US hospitals : the MIRIAD experience. *American Journal of Obstetrics & Gynecology, 97(3):S72–82..* https://doi.org/10.1016/j.ajog.2007.03.067

Johnson, L., Stinson, K., Newell, M., Bland, R., Moultrie, H., Davies, M., Sherman, G. (2012). The contribution of maternal HIV seroconversion during late pregnancy and breastfeeding to mother-to-child transmission of HIV. *Journal of Acquired Immune Deficiency Syndromes, 59*(4): 417–425. https://doi.org/10.1097/QAI.0b013e3182432f27

Joseph, J., Gotora, T., Erlwanger, A. S., Mushavi, A., Zizhou, S., Masuka, N., Mangwiro, A. (2017). Impact of Point-of-Care CD4 Testing on Retention in Care Among HIV-Positive

Pregnant and Breastfeeding Women in the Context of Option B + in Zimbabwe : A Cluster Randomized Controlled Trial, J Acquir Immune Defic Syndr.*75*: 190–197. doi:10.1097/QAI0000000000001341.

Kendall, Tamil. (2014). "Consequences of Missed Opportunities for HIV Testing during Pregnancy and Delayed Diagnosis for Mexican Women, Children and Male Partners." PLoS ONE 9 (11) (November 5): e109912. doi:10.1371/journal.pone.0109912. http:// dx.doi.org /10.1371/journal.pone.0109912.

Kieffer, M. P., Nhlabatsi, B., Mahdi, M., Hoffman, H. J., Kudiabor, K., & Wilfert, C. M. (2011). Improved Detection of Incident HIV Infection and Uptake of PMTCT Services in Labor and Delivery in a High HIV Prevalence Setting, *57*(4), 85–91. doi:10.1097/QAI.ob013e31821acc6e

Kimbugwe, G., Mshilla, M., Oluka, D., Nalikka, O., Zalwango, S., Kilizza, U., Galiwango, J. (2015). HHS Public Access, *4*(9), 740–750. doi:10.4236/ojpm2014.49084

KMCC. (2015). Eliminating Mother-to-Child Transmission of HIV in Uganda by 2015 : What will it take? *The Uganda HIV/AIDS Knowledge Management and Communications Capacity (KMCC) Initiative Final*, (1): 1–83. https://www.eldis.org/document/A69385

Konje, E. T., Tito, M., Magoma, N., Hatfield, J., Kuhn, S., Sauve, R. S., & Dewey, D. M. (2018). Missed opportunities in antenatal care for improving the health of pregnant women and newborns in Geita district , Northwest Tanzania, 1–13. https://doi.org/10.1186/s12884-018-2014-8

Kudakwashe *et al.* (2014). Factors Associated with Ever Being HIV-Tested in Zimbabwe: *An Extended Analysis of the Zimbabwe Demographic and Health Survey* (2010–2011). PLoS ONE 11(1): e0147828. doi:10.1371/journal.pone.0147828

Larsson, ThorsonAE, Pariyo G, WaiswaP, Kadobera D, Marrone G, Ekstrom A M, (2012):) Missed Opportunities: B*arriers to HIV Testing during Pregnancy from a Population Based Cohort Study in Rural Uganda.* PLoS ONE 7(8): e37590. doi:10.1371/journal.pone.0037590

Livingston, E. G. (2002). Management of HIV in pregnancy. *Current Women's Health Reports.* 2002;2(4):245–252. https://www.ncbi.nlm.nih.gov/pubmed/12150750

Lockman, S., & Creek, T. (2017). Acute Maternal HIV Infection during Pregnancy and Breast-Feeding: Substantial Risk to Infants, (September, 2017), 667–669. https://doi.org/10.1086/605124

Lubega, A., Joel, B., & Lucy, N. J. (2017). Incidence and Etiology of Surgical Site Infections among Emergency Postoperative Patients in Mbarara Regional Referral Hospital , South Western Uganda, *Surgery Research and Practice.* 1-6 https://doi.org/10.1155/2017/6365172

Mbena, H., Seni, J., Kajura, A., Matovelo, D., & Kihunrwa, A. (2014). Human Immunodeficiency Virus Seroconversion and Associated Risk Factors among Pregnant Women Delivering at Bugando Medical Center in Mwanza , Tanzania, *4*(5), 733–737. doi:10.4103/2141-9248.141539

Merchant & Lala, (2005). Prevention of mother-to-child transmission of HIV--an overview. *The Indian Journal of Medical Research*. 2005 Apr; 121(4): 489–501. https://www.ncbi.nlm.nih.gov/pubmed/15817958

Miller, S., & Cohen, C. R. (2011). HIV / AIDS Stigma and Refusal of HIV Testing Among Pregnant Women in Rural Kenya : Results from the MAMAS Study, 1111–1120. https://doi.org/10.1007/s10461-010-9798-5

Ministry of Health Uganda, (2018). https://health.go.ug/community-health-departments/vht-community-health-extension-workers

MOH. (2018). Ministry of Health Consolidated Guidelines For Prevention, (April, 2018).

MOH Uganda. (2014). Ministy of health elimination of mother to child transmission of HIV and pediatric HIV / AIDS care annual report 2013 / 2014. https://www.prefa.or.ug/.../PREFA-contribution-to-ACP-EMTCT-2013-14-annual-report-1.pdf

MOH Uganda (2017). HIV and AIDS in Uganda. https://reliefweb.int/report/uganda/uganda-population-based-hiv-impact-assessment-uphia-2016-2017-fact-sheet-august-2017

Mwembo-Tambwe, A. N. K., Kalenga, M. K., Donnen, P., Humblet, P., Chenge, F. M., Dramaix, M., & Buekens, P. (2013). *[HIV testing among women in delivery rooms in Lubumbashi, DR Congo: A catch-up strategy for prevention of mother-to-child transmission.]. Revue d'epidemiologie et de sante publique.* https://doi.org/10.1016/j.respe.2012.05.008

Nakubulwa, S., Kaye, D. K., Bwanga, F., Tumwesigye, N. M., Nakku-, E., & Mirembe, F. M. (n.d.). Original Article Incidence and risk factors for herpes simplex virus type 2 seroconversion among pregnant women in Uganda : A prospective study. https://doi.org/10.3855/jidc.6874

Namara-Lugolobi, E. C., Nakigozi, G., Namukwaya, Z., Kaye, D. K., & Nakku-Joloba, E.

(2017). Prevalence and predictors of unknown HIV status among women delivering in Mulago National Referral Hospital, Kampala, Uganda. *African Health Sciences*, *17*(4), 963–973. https://doi.org/10.4314/ahs.v17i4.3

Nyeko, & Ochola. (2012). Improving Linkage to PMTCT at St. Mary's Hospital Lacor., (October).

Ononge, S., Karamagi, C., Nakabiito, C., Wandabwa, J., Mirembe, F., Rukundo, G. Z., & Jennings, L. (2014). International Journal of Gynecology and Obstetrics Predictors of unknown HIV serostatus at the time of labor and delivery in. *International Journal of Gynecology and Obstetrics*, *124*(3): 235–239. https://doi.org/10.1016/j.ijgo.2013.08.011

Pariyo, G., Waiswa, P., Kadobera, D., Marrone, G., & Ekstro, A. M. (2012). Missed Opportunities : Barriers to HIV Testing during Pregnancy from a Population Based Cohort Study in Rural Uganda, *7*(8). https://doi.org/10.1371/journal.pone.0037590

PMTCT: Testing and Treatment of Infants 2015. (2016). https://www.mic.uct.ac.za/sites/default/files/images/51/2015_PMTCT_infants_0.pdf

Roongpisuthipong, A., Siriwasin, W., Simonds, R. J., Sangtaweesin, V., Vanprapar, N., Wasi, C., Collaborative, B. (2001). HIV Seroconversion During Pregnancy and Risk for Mother-to-Infant Transmission. *J Acquir Immune Defic Syndr*;26:348–351. Lippincott Williams & Wilkins, Inc., Philadelphia. https://www.ncbi.nlm.nih.gov/pubmed/113171077

Rogers, A. J., Akama, E., Weke, E., Blackburn, J., Owino, G., Bukusi, E. A., Turan, J. M. (2017). Implementation of repeat HIV testing during pregnancy in southwestern Kenya : progress and missed opportunities. https://doi.org/10.1002/jia2.25036

Rogers, A. J., Weke, E., Kwena, Z., Bukusi, E. A., Oyaro, P., Cohen, C. R., & Turan, J. M. (2016). Implementation of repeat HIV testing during pregnancy in Kenya: a qualitative study. *BMC Pregnancy and Childbirth*, *16*(1), 151. https://doi.org/10.1186/s12884-016-0936-6

Rispel, L. C., Peltzer, K., Metcalf, C. A., & Treger, L. (2009). Assessing missed opportunities for the prevention of mother-to-child *HIV transmission in an Eastern Cape local service area*, 99:174–9 https://www.ncbi.nlm.nih.gov/pubmed/19563095

Sandqvist, J., Wahlberg, J., Muhumuza, E., & Andersson, R. (2011). HIV Awareness and Risk Behavior among Pregnant Women in Mateete, Uganda (2010). *ISRN Obstetrics and Gynecology*, December 2011, 1–7. https://doi.org/10.5402/2011/709784

Schacht, C. De, Hoffman, H. J., Lucas, C., Alons, C. L., Madonela, A., Vubil, A., & Jr, O. C. F.

(2014). High Rates of HIV Seroconversion in Pregnant Women and Low Reported Levels of HIV Testing among Male Partners in Southern Mozambique : Results from a Mixed Methods Study, 1–17. https://doi.org/10.1371/journal.pone.0115014

Semali, Damian Jeremiah Damian, Hapiness Pius Saronga & Deogratius Malamsha. (2014). Factors associated with HIV testing and receiving results during antenatal care in Tanzania, *28*(2). *Afr Popul Stud;*28 Suppl 2:1035–45. https://doi.org/10.11564/28-0-555

Sithole, P. M., & Khunou, S. H. (2016). Factors contributing to missed opportunities in the prevention of mother to child transmission programme in the sub-district of Ngaka Modiri Molema, North West Province, South Africa. North-West University. https://www.ajol.info/index.php/ajpherd/issue/view/14908

Suellen, M., Janet M. Turan, Elizabeth A. Bukusi, Maricianah Onono, William L. Holzemer & Craig R. Cohen. (2011). H*IV / AIDS Stigma and Refusal of HIV Testing Among Pregnant Women in Rural Kenya : Results from the MAMAS Study*, 1111–1120. https://doi.org/10.1007/s10461-010-9798-5

Theron, G. B., Cababasay, M. P., Dyke, R. B. Van, Shapiro, D. E., Jeanne, Louw, Maupin, R. (2013). Prevalence of HIV among women entering labor who accepted or declined voluntary counseling and testing. *Int J Gynaecol Obstet. 120(2).,*:141–143. https:// doi.org/10.1016/j.ijgo.2012.07.029

Theron, G. B., Shapiro, D. E., Van Dyke, R., Cababasay, M. P., Louw, J., Watts, D. H., Maupin, R. (2011). Rapid intrapartum or postpartum HIV testing at a midwife obstetric unit and a district hospital in South Africa. *International Journal of Gynecology and Obstetrics*, *113*(1): 44–49. https://doi.org/10.1016/j.ijgo.2010.10.011 tmi12432-2.pdf. (n.d.).

UAC. (2015). *The HIV and AIDS Uganda country Progress Report 2014*. Page 1

Uganda AIDS Commission. (2017). *Situation Of Hiv/Aids Among Ugandan Youth. Uganda Population-Based HIV Impact Assessment,* (August 2017), 62–65.

Ugandan HIV Prevention and Control Act. (2014).

Ukaire, B. C., & Durojaiye, K. W. (2015). The Prevalence of Human Immunodeficiency Virus Infection among Pregnant Women in Labour with Unknown Status and those with Negative status early in the Index Pregnancy in a Tertiary Hospital in Nigeria .,*Afr J Reprod Health. 2015;19*(3): 137–143. https://www.ncbi.nlm.nih.gov/pubmed/26897922

UNAIDS. (2017). Global HIV and AIDS statistics. https://www.unaids.org>resources>factsheet

Ulrika Baker A, Stefan Peterson B, Tanya Marchant C, Godfrey Mbaruku D, Silas Temu D, F.

M. d & C. H. (2015). *Identifying implementation bottlenecks for maternal and newborn health interventions in rural districts of the United Republic of Tanzania.* https://doi.org/http://dx.doi.org/10.2471/BLT.14.141879

UNAIDS. (2012). *Joint United Nations Programme on HIV/AIDS.* https.//www.unaids.org/sites/defaults/files/media_asset/20121120_global_report_2012_with_annexes_en_1.pdf

Unite for children. Unite against AIDS. (2010). *Uganda : PMTCT*, 14–15.

Wamala-mucheri, P., Akol, A., Mercer, S., & Chen, M. (2016). Expanding HIV testing and counselling into communities : Feasibility , acceptability , and effects of an integrated family planning / HTC service delivery model by Village Health Teams in Uganda, (April), 1050–1057. https://doi.org/10.1093/heapol/czw035

Were, F., Afrah, N. A., Chatio, S., Manda-, L., Pell, C., Men, A., … Pool, R. (2013). Factors Affecting Antenatal Care Attendance : Results from Qualitative Studies in Ghana , Kenya and Malawi, *8*(1). https://doi.org/10.1371/journal.pone.0053747

World Health Organisation. (2017). HIV/AIDS.

Zaba, B., Calvert, C., Marston, M., Isingo, R., Nakiyingi-Miiro, J., Lutalo, T., Ronsmans, C. (2013). Effect of HIV infection on pregnancy-related mortality in sub-Saharan Africa: Secondary analyses of pooled community based data from the network for Analysing Longitudinal Population-based HIV/AIDS data on Africa (ALPHA). *The Lancet, 381*(9879): 1763–1771. https://doi.org/10.1016/S0140-6736(13)60803-X

Zeng, H., Chow, E. P. F., Zhao, Y., Wang, Y., Tang, M., Li, L., Zhang, L. (2016a). Prevention of mother-to-child HIV transmission cascade in China: a systematic review and meta-analysis. *Sexually Transmitted Infections*, *92*(2): 116–123. https://doi.org/10.1136/sextrans-2014-051877

APPENDIX I: INFORMED CONSENT DOCUMENT

KAMPALA INTERNATIONAL UNIVERSITY (KIU) WESTERN CAMPUS (WC)

RESEARCH ETHICS COMMITTEE (REC)

PO Box 71, Bushenyi, Uganda; Tel: +256 758 096 775

E-mail: kiurec2017@kiu.ac.ug; Website: www.kiu.ac.ug

Study Title:

MISSED OPPORTUNITY FOR HUMAN IMMUNODEFICIENCY VIRUS TESTING AMONG MOTHERS DELIVERING AT KAMPALA INTERNATIONAL UNIVERSITY TEACHING HOSPITAL.

Principal Investigator(s):

Dr. **FARHIYA MOHAMMED KORIOW** a postgraduate student at the department of Obstetrics and Gynecology in Kampala International University Teaching Hospital Western Campus. **Qualifications**: Bachelor of medicine and surgery (University of Nairobi 2010).

INTRODUCTION

What you should know about this study

- You are being asked to join a research study;
- This consent form explains the research study and your part in the study;

Leave blank (for REC Office only): KIU WC REC Stamp:	For REC Office use only: APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

- Please read it carefully; and take as much time as you need;
- You are a volunteer. You can choose not to take part; and if you join, you may quit at any time. There will be no penalty if you decide to leave the study.

Background to the study.

Human Immunodeficiency Virus is a global burden with more than 70 million people getting infected from the beginning of the epidemic and about 35 million people have died of HIV. Globally, 36.7 million people were living with HIV at the end of 2016. 36.7 million people living with HIV/AIDS worldwide in 2016 with 1.0 million people dying of HIV-related illnesses worldwide in 2016.

Although HIV testing should be routinely offered during antenatal care, the proportion of women giving birth without knowing their HIV status is still important worldwide and in Uganda. This is despite the fact that they attend antenatal care in hospitals. Certainly worse still is pregnant women who don't attend antenatal care and end up delivering in the hospital showing the significance of testing this women during labor. The rapid testing for HIV is significantly acceptable by laboring women in labor rooms (Mwembo-Tambwe *et al.*, 2013) hence adopting testing during labor is quite achievable for these women who have not tested during antenatal care. Voluntary counseling and Testing (VCT) is accepted in labor rooms and this strategy combined with antenatal care testing may reduce the rate of mother to child transmission of HIV significantly.

Uganda is where HIV was first discovered in the 1980s, from where it spread rapidly, and by the early 1990s the average national HIV prevalence in Uganda was 18% in rural areas and 25%–30% in major urban areas. The transmission of HIV from mother to child is the second most common route of transmission of HIV in Uganda. The risk of HIV transmission from mother to child is approximately 45% if no safety measures have been taken (Sandqvist *et al.*, 2011).

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

Purpose of the research project

The study shall provide data on whether or not one of the crucial pillars of Elimination of Mother to Child Transmission (EMTCT) of Human Immunodeficiency Virus (HIV) which is, testing for HIV is being implemented. Knowing the magnitude of laboring women who do not know that they are Human Immunodeficiency Virus seropositive shall reflect if there is an unmet goal of EMTCT or whether the program is moving towards achieving its set goals and purposes. In a world where prevention of HIV transmission to the newborn is of paramount importance, detection of HIV in any laboring woman shall help to start antiretroviral treatment and appropriate measures shall be taken to prevent infection in the newborn, starting from interventions that should be avoided in labor that otherwise would have been done if she were negative. This shall enable a healthy and productive generation to be brought up. The community shall benefit in that women around Bushenyi and Kampala International University Teaching Hospital catchment referral hospitals shall be more aware about the importance of testing for Human Immunodeficiency and they shall be counseled adequately about HIV disease prevention.

Why you are being asked to participate

You have been chosen randomly to participate in this study because you meet the designed inclusion criteria of the study. All women who have never tested for Human Immunodeficiency Virus (HIV) prenatally or have been tested but with no documented evidence of testing for HIV or have tested but their last testing for HIV was more than three months prior to labor have been given an equal chance to participate. When u take part in the study information generated will be used to determine if there is a problem in routine HIV testing during pregnancy and what are the possible challenges/barriers leading to lack of HIV testing in pregnancy and whether HIV testing during labor should be adopted routinely.

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

Procedures:

If you agree to participate in the study you will be given more information regarding the study and asked to sign a consent form. Upon signing this consent form, a unique dummy number shall be assigned to you for identification purposes and you shall be allowed time to answer the questions in the questionnaire, and then a specimen sample in the form of blood shall be taken from your index finger and the blood tested for Human Immunodeficiency Virus antibodies. The results of which shall be communicated to you and management plan instituted according to the results of the test. You will then be required to answer a few questions after delivery to try find out the reason why you were not tested.

Risks/Discomforts

There are no anticipated risks to the patient in this study that is beyond that rendered by the necessary treatment that she will deserve in the hospital. The potential inconveniences might include answering questions after delivery and some psychological stress as the patient is awaiting new Human Immunodeficiency Virus (HIV) test results or in the event that the test shows that the patient seroconverted during pregnancy of which the patient shall receive adequate counselling post testing to try to help them cope with their results. Specimen sample collection is via needle prick which might cause some minimal pain or discomfort. If at any one point the patient shall not be comfortable with the questions being asked or they start feeling any distress from retesting they are allowed to withdraw from the study.

Benefits

The study intends to detect any possibility of having acquired Human Immunodeficiency Virus and in which case measures shall be put in place during labor and the immediate postpartum period to reduce the chance of transmission of infection to the newborn.

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

The study intends to also find out if there is a problem with routine Human Immunodeficiency Virus (HIV) testing during pregnancy and the barriers to HIV testing this shall lead to mass sensitization of the need to appropriately implement routine HIV testing during pregnancy and thus reduce these missed opportunities to HIV testing. The information/data collected can be used to draft policies or re-enforce existing policies on routine HIV testing in labor. The patient shall also enjoy close monitoring by assigned health worker during the period of study and have their concerns readily answered.

Incentives/Rewards for Participating

No payment shall be made to you for purposes of participation in this study. Maximal ethical norms shall be adhered to you as the participant. No form of coercion or any other form of incentives shall be offered to you but reimbursement shall be offered where applicable. Any appreciation given to you shall be part of research protocol.

Protecting data confidentiality:

The records of result assessment of the questionnaire and of the Human Immunodeficiency Virus antibodies testing of blood specimen shall be accessible to the principle investigator. These results shall not be disclosed to anyone without the consent of the research participant. Access to data shall be strictly limited to those involved in the study. All data collected shall be locked in a cabinet in the maternity ward. However, university ethics and internal review board may have to review data collection tool to cross check how they shall have been handled as the study is being carried out but they shall not be able to correlate response with any patient's name. We shall ultimately use the patient's response only for the study.

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

Protecting subject privacy during data collection

Data shall be obtained in an enclosed private place in the maternity ward and during the process of obtaining data, dummy numbers and not participant's initials shall be used. The patient's initials or name shall not be used. The codes commonly used and internationally recognized for recording Human Immunodeficiency Virus (HIV) Testing results shall be used during data collection. The code shall be "NR" for recording a negative test result for HIV and "R" for a positive HIV test result shall be used. Patient result's privacy shall be maintained even though these codes are used as the patient's name or initials shall not be used, instead a dummy number shall be used.

Right to refuse/withdraw

Your participation in the study is purely voluntary, and refusal to participate will involve no penalty or loss of benefits that you deserve.

What happens if you leave the study?

You are invited to participate in the study and that it is your right to accept or not to accept and that your refusal to participate shall not interfere with the services provided to you at Kampala International University Teaching Hospital. Even if you first accepted to participate and then during the study you decide not to continue participating, you may choose to opt out of the study or discontinue participation at any time without penalty or loss of benefits.

Who do I ask/call if I have questions or a problem?

In case any further clarification about this study is required, please contact the principle investigator through the following contact:

Dr. Farhiya Mohammed Koriow, a student at Department of Obstetrics and Gynecology, Kampala International university, Tel. +256702510076 or Prof. Bonet Ivan Tel +256772 387977.

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

PART A: CONSENT FOR THE STUDY

What does your signature (or thumb print/mark) on this consent form mean?

Your signature on this form means that you have:

- Been informed about this study's purpose, procedures, and possible benefits and risks;
- Been given the chance to ask questions before you sign; and
- Voluntarily agreed to be in this study.

Print name of adult participant	Signature of adult participant/legally authorised representative	Date
Print name of person obtaining consent	Signature	Date
Thumb print/mark	Signature of witness	Date

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

PART B: CONSENT FOR HIV TESTING

I .....have been educated and counseled about the study, its benefits and its risks and have accepted to undergo Human Immunodeficiency Virus (HIV) testing to be able to know my HIV status and have communicated this to my spouse/partner or guardian/parent via a phone call in his or their absence or directly in his or their presence and who have also consented for me to undergo HIV testing and has assured me his support whatever the outcome of the results. I have understood explanation given to me and with my spouse/partner's full support, I hereby give my consent in form of a signature/thumbprint for HIV testing to be carried out on me.

Print name of adult participant	Signature of adult participant/legally authorised representative	Date
Print name of person obtaining consent	Signature	Date
Thumb print/mark	Signature of witness	Date
Thumb print/mark	Signature of spouse /guardian Who is present at the time of delivery	Date

Leave blank (for REC Office only):	**For REC Office use only:**
KIU WC REC Stamp:	APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

APPENDIX II: TRANSLATED CONSENT FORM

EKIHANDIIKO KY'OKUHAMYA OKWIKIRIZANA AHA KWEGAITA OMUKUCONDOOZA

OMUTWE GW'OKUCONDOOZA: Obwingi bw'abakazi b'enda abatarikukyebeza akakooka ka munywengye hamwe n'ebirikureeta okutakyebeza omubakazi abarikuzaarira omu irwariro ry'eitendekyero rikuru erya Kampala Intanashonolo ah'eitagi erya burengyerweizooba rya Uganda

Mukuru w'okucondooza: Dokita Farhiya Mohammed.

Obwegyese: Diguri y'ebyobushaho n'okushemeza okuruga omwitendekyero erikuru erya Nairobi. Kandi hati nashoma Diguri ya kabiri ey'ebyobushaho n'okuzaarisa ah'eitendekyero rikuru erya Kampala Intanashonolo

OKWANJURA/OMUTWE GW'OKUCONDOOZA

Eby'oshemereire kumanya aha kucondooza oku

a. Noshabwa otarikugyemwa kwegaita omukucondooza oku okurikukwata aha bwingi bw'abakazi b'enda abatarikukyebeza akakooko ka munywengye/siriimu hamwe n'ebirikureeta okutakyebeza omubakazi abarikuzarira omwirwariro eri.

b. Ekihandiiko eki nikishoborora aha kucondooza oku hamwe n'ebikwatiraine n'obugabe bwaawe nk'omwe aharyabo ab'egaitsire omukucondooza oku kandi n'ebyoshemereire kuba n'okora omukucondooza oku. Ku oraikirize kwegaita omukucondooza oku noija kubuuzibwa ebibuzo bikye ebikwatirine n'enda eyoyine obwahati, ebikwatirine n'okwobeire n'okyebeza enda, ku oraabe arayekyebeize ho akakooko kamunywengye (siriimu) kandi hamwe n'emyeezi ehwireho bwanyima y'okukyebeza. Ebindi bibuuzo n'ebikwatiraine n'okumanya kwawe ahabikwatirine nokukyebeza akakooko kamunywengye/siriimu hamwe n'enshonga ezirikureeta bamwe baremwa kukyebeza nainga abo abarekyebeizeho okutagaruka kukyebeza.

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

Noija kuhumurizibwa kandi agarukye okyeberwe okumanya oku amagara gaawe gemereire ahabikwatirine n'akakooko kamunywengye (siriimu) obwo waheza kusharamu kwegaita omukucondooza oku, bwanyima y'okuhumurizibwa hamwe n'okushobororerwa kurungi. Okukyebera nikwija kwetengyesa okukwihaho amatondo makye g'eshagama agokukozesa.

c. Gyezaho oshome kurungi ebiri omukihandiiko eki okuhitsya obu orantungye okumarwa ngu wayetegyereza kurungi buri kimwe ekirikugambwaho hamwe n'okubuuza ahabyoraabe otaashoborokyerwa kurungi.

d. Okwegaita omukucondooza n'okikora okurugirira ahakukunda kwaawe hatariho kugyemwa kwoona. Nobaasa kwanga kwegaita omukucondooza oku kandi nobaasa n'okurugamu eshaaha yoona hatariho ekirikukuteera aha mukono nainga kugira eki orafeerwe omubujanajabi obu oshemereire kutunga.

Ebikwatiraine n'okucondooza oku

Akakooko kamunywengye nikarebeka kuba enshonga y'amaani omunsi yoona ahabwokuba kabatsize kukwata abantu abarikweshumba obukaikuru 70 kuruga obukatandika kujanjara kandi abantu abarikuhika obukaikuru 35 bamazire kufa ahabwendwara egi. Aharurengo rw'ensi yoona, abantu abarikwingana nk'obukaikuru 36 n'obucweeka 7 bakashangwa beine endwara y'akakooko kamunywengye ahamuheru gw'omwaka gwa 2016, kandi aharyaabo hariho abantu abarikwingana akakaikuru kamwe abafiire ahabwendwara eziine akakwate n'akakooko kamunywengye/siriimu omumwaka nigwo gumwe.

Ehururu narishi entebekanisa ekwatirine n'okuhwera omukazi w'enda kutaturira omwanawe oburwaire bwa siriimu, neyomugasho munonga omukumanya ahabikwatirine n'oku akakooko kamunywengye/siriimu karikukwata narishi kujanjaara. Entebekanisa ekwatirine n'okuhwera omukazi w'enda kutaturira oburwaire omwaanawe egyerizeho kukyendeza namunonga omubakazi abaine enda nainga barikwontsya. Nobukiraabe kiri kityo, obwahati, hakiriho enshonga ezirikuretera abaana bakwatwa akakooko ka siriimu ekireteire okuturira endwara ahagati yabakazi b'enda n'abaana batakazairwe nainga barikwonka kwayeyongyera.

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

Ekigyendererwa narishi omugasho gw'okucondooza oku

Okumanya omubaro gw'abakazi b'enda abatarikumanya amagara gaabo okugemereire ahabikwatiraine n'akakooko kamunywengye/siriimu nikwija kuhwera omu kigyendererwa ekyokwihiraho kimwe abakazi kuturira siriimu abaana baabo bakiri omunda nainga kurabira omumashereka, ahabwokuba omukazi w'enda ku arikushangwa aine akakooko kamunywengye/siriimu nikimuhweera kutandika okumira emibazi omubwiire kandi n'okurwanisa oburwaire obwo nikiija kutekwaho omujinya okwenda ngu butakwata omwaana.

Eki nikiija kuhweera entebekanisa/ehururu z'okuzibira endwara egi kujanjaara n'okutunguura eby'obujanajabi. Ekindi, ebyanga bitaribimwe nabimwe nibyeija kuhwerwa ahabwokuba abakazi nibaija kumanya amagara gaabo okugemereire kandi obwo bashomesiibwe kandi bahumuriziibwe ahibikwatiraine n'okwerinda akakooko kamunywengye/siriimu.

Ahabwenki noshabwa kwegaita ahakucondooza oku?

Otoreinwe kwegaita omukucondooza oku ahabwokuba oine ebirikwetengwa aha omuntu oshemereire kuzamu. Abakazi boona abaizire kuzarira omwirwariro eri nibaheebwa omugisha gw'okwegaita omukucondooza oku obwo baaba nibahikiriza ebirikwetengwa kuzamu.

Eby'okugyederwaho

Waheza kuta omukono gwaawe ahakihandiiko eki, noija kuheebwa obwiire kugarukamu ebibuuzo ebikwatiraine n'okucondooza oku kandi amatondo makye g'eshagama yawe nigeija kukweihwaho gakyeberwe kumanya oku oyemereire ahabikwatiraine n'akakooko ka siriimu.

Hariho akabi no'butaguubwagye ebirikubaasa kukuhikaho ahabwokwegaita omukucondooza oku?

Tihariho akabi k'amaani akuturikuteekateeka ngu nikaija kukuhikaho ahabwokwegaita omukucondooza oku okwihaho ebirikubaho buriijo aha mukazi owaija omwirwariro kuzaara nainga kujanjabwa. Ebyakubaasa kukuteganisa n'okugarukamu ebibuuzo kandi obwo ori omubwiire bwokuzaara. Ekindi ekirikubaasa kukubuza obusingye n'okutegyereza ebirarugye omukukyebera eshagama yaawe ningashi kumanya ngu eshagamayawe erimu akakooko kandi obwo oyine enda.

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

Okwihwaho amatondo g'eshagama yaawe barikukozesa empitirizo nikibaasa kukuretera okushaasha hamwe n'okutahuriragye kwonka eki n'ekintu ekirikukira kubaho omwirwariro kandi ekitashemereire kukutinisa. Wagira nk'oku otahuriragye omukugarukamu ebibuuzo nainga kuhurira kubi waba nokyebeza, noikirizibwa kwanga kandi okaruga omukucondooza oku.

Okuwakubaasa kugatsirwa omukucondooza oku

Okucondooza oku gugyendereire kuzoora yaaba hariho ebirikureetera akakooko kamunywengye/siriimu kakwata omwaana karikuruga ahari nyina kandi n'okureeba emihanda eyakubaasa kutebwaho namunonga omubwiire bw'okuzaara nainga bwanyima y'okuzaara eyakubasa kuhweera omu kukyendeeza okujanjaaza akakooko hamwe n'oburweire omu bereere.

Hariho okushashurwa ahabwokwegaita omukucondooza oku?

Tihariho okushashurwa nainga ebirabo ebirakuheebwe ahabwokwegaita omukucondooza oku. Akasiimo koona akarakuheebwe omumuringo gwoona tikashemereire kutwarwamu nk'empeera y'okuza omukucondooza.

Okubiika Ebihama

Ebirarugye omukukyebeza eshagama yawe nibyeija kumanywa orikukurira okucondooza kwonka tibirikwiija kuheebwa omuntu weena hariho orusa kuruga aha muntu okyebeize eshagama. Ebihandiiko byoona ebirashohozibwe tibirikwiija kworeka amaziina nainga ahi omuntu arikuruga.

Okwehereera omu bwiire bw'okugarukamu ebibuuzo

Eby'okubuzibwa nibyija kukorerwa omumwanya gw'ekihama kandi ogukingire omukishengye ekya hooda eya mateneti

Obugabe bwokwanga nainga okuruga omukucondooza

Okwegaita omukucondooza oku n'ekyokweshariramu kandi okwanga nainga kurugamu tihariho ekirikubaasa kukuzibira kandi tihariho ekirihindura aha muringo ogw'oshemereire kuba nojanjabwamu.

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

Nimbuuza oha nainga ninyeta oha naaba nyine ekibuuzo nainga okuteganisibwa?

Nobaasa kugambira orikwebembera okucondooza oku aha simu namba 0702510076 nainga orikukurira akakiiko akarikureeberera eby'okucondooza ah'eitendekyero erikuru erya Kampala Intanashonolo, erya burengyrweizooba, aha namba y'esimu: 0758-096-775

Okuta omukono gwawe nainga ekinkumu kyawe aha kihandiiko eki nikimanyisaki?

Omukono gwawenaing ekinkumu aha kihandiiko eki nikimanyisa ngu:

- Omanyisibwe aha bigyendererwa by'okucondooza oku, emitwarize, ebirungi hamwe n'akabi ebirikubaasa kurugamu kand washoborokyerwa kurungi
- Oheirwe omugisha kubuuza ebibuuzo kandi washoborokyerwa buri kimwe otakateireho omukono gwawe nainga ekinkumu
- Oikiriize oyekundiire, katariho kugyemwa kwoona, kuza omukucondooza oku.

Eizina ryaawe	Omukono/Ekinkumu kyawe	Ebiro by'okwezi
Eiziina ry'orikurira okucondooza	Omukono	Ebiro by'okwezi
Eiziina ry'owaba ariho nk'omujurizi	Omukono/ekinkumu ky'omujurizi	Ebiro by'okwezi

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

EKICWEEKA KYA 2:

OKWIKIRIZA KUKYEBEZA AKAKOOKO KA SIRIIMU/MUNYWENGYE

Nyowe ..... nk'oku naheza kushobororerwa kurungi kandi n'okuhumurizibwa ahakucondooza oku, hamwe n'okumanyisibwa ebirungi kandi n'ebyakabi ebyakubaasa kurugamu; ninyikiriza kukyebeza akakooko ka munywengye/siriimu kugira ngu manye amagara gangye okugemereire. Ninyetegyereza gye obugabe bwangye nk'oku banshobororera kandi nataho n'omukono/ekinkumu kworeka okwikiriza kwangye kukyeberwa.

---------- ---------- ----------

Eizina ry'omuntu owaikiriza kukyebeza by'Okwezi | Omukono/Ekinkumu | Ebiro

_____ _____ _____

Eizina ryowashoborora | Omukono gw'owashoborora | Ebiro by'Okwezi

---------- ---------- ----------

Eizina ry'owabariho/ | Omukono gw'omujurizi | Ebiro by'Okwezi

Leave blank (for REC Office only): **KIU WC REC Stamp:**	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

APPENDIX III: QUESTIONNAIRE

SECTION 1: Contacts and Demographics

Patient serial number..... Date.....

Telephone contact.....

Next of kin..... Phone contact.....

Address.....

Date of admission: .....

Date of delivery: .....

Social Demographic Data

1. Initials
2. Maternal Age in years
3. Gravidity
4. Parity
5. Last normal Menstrual Period (LNMP)
6. Eexpected Date of Delivery (EDD)
7. Weeks of Amenorrhoea (WOA)
8. Level of education
   A) None
   B) Primary
   C) Secondary
   D) Institution/college
   E) Tertiary
9. Religion
   A) Christian
   B) Muslim
   C) Other
10. Marital Status

A) Married

B) Single

C) Widowed

D) Divorced

11. If married, is it

A) Monogomous

B) Polygamous

12. Occupation

A) Civil servant

B) Self Employed

C) Others

13. Tribe

A) Munyankole

B) Mukiga

C) Munyoro

D) Mutooro

D) Other

SECTION 2: Prevalence of missed opportunity for HIV testing

14. Did you attend ANC in this pregnancy?

A) Yes

B) No

15. If yes, how many times? ☐

16. If no, Give reasons why

.....

.....

17. During your ANC visits, were you offered HIV counselling and testing?

A) Yes

B) No

18. If yes, at what gestation age? ☐

19. And what was the result?

A) Positive

B) Negative

20. Were you offered Post HIV testing counselling?

A) Yes

B) No

21. If yes, did you comprehend?

A) Yes

B) No

22. If No, what was the reason;

A) I don't know

B) No HIV testing kits

C) Other

.....

.....

.....

Prevalence of HIV positive results

23. What is the result of Determine kit?

A) Positive

B) Negative

24. If positive with Determine, Do StatPack test

A) Positive

B) Negative

C) Not applicable

25. If negative with StatPack, Do Unigold test

A) Positive

B) Negative

C) Not applicable

SECTION 3: Factors associated with missed opportunities

Knowledge about HIV

26. Do you know about HIV/AIDS?

A) Yes

B) No

27. If yes, how is it transmitted?

A) Blood and blood products

B) Sexual intercourse

C) Mother to child transmission

28. Can a pregnant woman get infected with HIV?

A) Yes

B) No

29. If yes, how is it transmitted?

A) Blood and blood products

B) Sexual intercourse

C) Mother to child transmission

30. If no in 27 above, give reasons why

.....

31. Where did you get this information from?

A) ANC

B) Friends

C) Village Health Team

D) VCT centres

32. Can a pregnant HIV positive woman infect the unborn baby?

A) Yes

B) No

33. If yes, at what time could the infection be transmitted? (Tick where appropriate)

A) During pregnancy

B) During labour

C) During breastfeeding

34. Can you prevent HIV infection to fetus?

A) Yes

B) No

35. If yes, How?

.....

Family dynamics and social factors

36. Who is the decision maker at home as regards HIV testing?
    A) Myself
    B) Spouse/Partner
37. Do you know the HIV status of your partner?
    A) Yes
    B) No
38. If yes, what is it?
    A) Positive
    B) Negative
39. If no in 35 above, could you please tell us why?
    A) Spouse or partner has never tested
    B) Spouse or partner is afraid of testing
40. If the answer to question 36 is positive, are you using condoms during sexual intercourse?
    A) Yes
    B) No
41. If no, give reasons.
    A) Spouse or partner does not want
    B) You do not want
42. Do you live with your partner/spouse?
    A) Yes
    B) No
43. If no in 38 above, why?
    A) Husband lives in another town
    B) Partner is not alive
44. Will your husband have a problem if you test without his approval?
    A) Yes
    B) No
45. If yes, could the following be a possible reason

A) Fear of testing positive and living with HIV

B) Fear of stigmatization from the community

C) Fear that the test outcome might disrupt the family

46. If no in 43 and you go ahead with the test will a positive HIV result end you relationship with your partner/ spouse

A) Yes

B) No

APPENDIX IV: TRANSLATED QUESTIONNAIRE
EBIBUUZO BY'OKUGARUKWAMU OWASHARAMU KWEGAITA OMUKUCONDOOZA

EKICWEKA KY'OKUBANZA: Ebirikukukwataho

Enamba y'omurwaire..... Ebiro by'okwezi.....

Enamba eyesimu.....

Muhikirwa/omunyabuzaare wawe.....

Ahorikuruga.....

Ebiro byokwezi ebiwagyereireho ahakitanda omwirwariro .....

Ebiro by'okwezi ebiwazarireho: .....

Ebirikukwata ahantuura yaawe

1. Amaziina gaawe omubugufu
2. Emyaka yaawe
3. Ogizireho enda emirundi engahi?
4. Eri neizaara rya kangahi?
5. Ebiro obuwahereruka kuza omu micwe/omukwezi
6. Ekiro eky'orikuteekateeka kuzariraho
7. Esabiiti/wiiki ez'omazire okuruga obuwahereruka kuza omu micwe/omukwezi
8. Obwegyese bwaawe:
   A) Tindashomire
   B) Purayimare
   C) Siniya
   D) Amatendekyero agarengire aha siniya
   E) Amatendyero agahaiguru
9. Ediini

A) Omukuratsi wa Kirisito

B) Omusiraamu

C) Ezindi diini

10. Eby'obushwere

A) Nshweirwe

B) Tinkashweirwe

C) Ndi efakazi

D) Tukataana

11. Ku' oraabe oshwiirwe, baro aine abakazi bangahi?

A) Omwe

B) Omwe n'okushoba

12. Ebyemirimo

A) Ndi omukozi wa gavumenti

B) Ninyekozesa

C) Ninkora Endijo mirimo

13. Oruganda

A) Omunyankole

B) Omukiga

C) Omunyoro

D) Omutooro

E) Ezindi Enganda

EKICWEKA EKYAKABIRI: Obwingi bwabakazi b'enda abatakyebezaga akakooko ka munywengye/siriimu

14. Okakyebeza enda aheirwariro?

A) Eego ☐

B) Ngaha ☐

15. Kworaabe wakyebeize, Okakyebeza emirundi engahi? ☐

16. Kworaabe otarakyebeize, nahabwenki?

.....

.....

17. Obu waza kukyebeza enda, bakakuha omugisha gwokukyebeza akakooko ka munwengye/siriimu?

A) Eego ☐

B) Ngaaha ☐

18. Kubaraabe bakukyebeire, enda ekaba eine emyezi engahi?

19. Ebyarugire omukukyebera nibiiha?

A) Nyine akakooko ka munwengye/siriimu

B) Tinyine kakooko ka munwengye/siriimu

20. Okaheebwa okuhumurizibwa kubamazire kukukyebera?

A) Eego

B) Ngaaha

21. Obwo okabishoborokyerwa?

A) Eego

B) Ngaaha

22. Kukiraabe ngu apaana, ahabweenki?

A) Tinkumanya

B) Ebyokukozesa bikaba bitariho

C) Endiizo nshonga yoona

.....

.....

Eby'okujanjaara kw' akakooko ka Munwengye/siriimu

23. Ebyaruga omu kukyebeza akakyebereso akubrikweeta "Determine kit":

A) Nyine akakooko

B) Tinyine kakooko ka siriimu

24. Byaaba byayoreka ngu eshagama terimu kakooko ka siriimu, kyebeza akakyebereso akarikweetwa "Statpack test"

A) Nyine akakooko

B) Tinyine kakooko ka siriimu

C) Tikirikwetengyesa kukigarukamu

25. Byaaba byayoreka ngu eshagama terimu kakooko ka siriimu, kyebeza akakyebereso akarikweetwa "Unigold test"

A) Nyine akakooko

B) Tinyine kakooko ka siriimu

C) Tikirikwetengyesa kukigarukamu

EKICWEKA EKYAKASHATU: Enshonga ezikwatiraine nokuferwa omugisha gw'okukyebeza omubwiire by'okukyebeza enda:

Eby'orikumanya ah'akakooko ka munwengye/siriimu

26. Heine ebyorikumanya ah'akakooko ka munwengye/siriimu?

A) Eego

B) Ngaaha

27. Kukirrabe kiri ngu eego, nikajanjaazibwa kata?

A) Okurabira omukuhereza eshagama erimu oburwaire

B) Okuteerana n'omurwaire wa siriimu

C) okuruga ahari nyina w'omwaana kuza aha mwaana

28. Noteekateeka ngu omukazi w'enda nabaasa kukwatwa akakooko ka munwengye/siriimu?

A) Eego

B) Ngaaha

29. Kukirrabe kiri ngu Eego, nikajanjaazibwa kata?

A) Okurabira omu shagama erimu oburwaire

B) Okuteerana nomurwaire wa siriimu

C) Okuruga ahari nyinaw'omwaana kuza aha mwaana

30. Kukirrabe kiri ngu ngaaha, hereza enshonga ahabwenki?

.....

31. Okumanyisibwa oku okakwiiha nkahi?

A) Ndikukyebeza enda

B) Okuruga omuri banywani bangye

C) Omubarikukurira ebyamagara aha kyaro

D) Omumwanya gw'okukyeberezaho akakooko ka siriimu

32. Nooteekateeka ngu omukazi aine enda obwo aine akakooko kamunwengye nabaasa kukaturira omwanawe otakazairwe?

A) Eego

B) Ngaaha

33. Kyaba kiri ngu Eego, nooteekateeka ngu nakamuturira ahabwiire ki? (Kyebera byoona ebihikire)
    A) Aine enda
    B) Arikuzaara
    C) Arikwontsya omwaana
34. Nooteekateeka ngu hariho ebi omukazi w'enda yakubaasa kukorwa kugira ngu omwaana atakwaatwa akakooko ka siriimu?
    A) Eego
    B) Ngaaha
35. Kyaba kiri ngu Eego, nkabiiha?

.....

Ebirikwaata aha mituurire y'omumaka

36. Nomanya omwami/omukundwa waawe yaba aine akakooko kamunwengye/siriimu nainga atakaine?
    A) Eego
    B) Ngaaha
37. Kyaba kiri ngu Eego, ari ata?
    A) Aine akakooko
    B) Tayine kakooko ka siriimu
38. Waaba otarikumanya, noobaasa kutugambira ahabwenki?

.....

39. Nimukoreesa akapiira mwaba nimuteerana?
    A) Eego
    B) Ngaaha
40. Kyaba kiri "Ngaaha", nahabwenki?

.....

41. Notuura nomushaija waawe?
    A) Eego
    B) Ngaaha
42. Kyaba Ngaaha, nahabwenki?

.....

43. Orikusharaho kugira ngu mukyebeze akakooko ka siriimu omuka yanyu nooha?

A) Niinye

B) Nomushaija

APPENDIX V: COUNSELLING FORMS

Pre-HIV Test Counseling Checklist for Pregnant Women

(Group or individual session)

Client's Name: _____ **Client's File#:** _____

TOPIC	TICK
1. Introduce yourself and give an overview of the counseling session	
2. Review HIV basics, transmission, and prevention	
• Review HIV basics and answer questions	
• Modes of HIV transmission, including from mother to baby	
• Ways to prevent HIV transmission, including PMTCT	
3. Counsel on benefits of HIV testing	
• You cannot tell from looking at a person if he or she has HIV	
• Everyone should learn their HIV-status, especially pregnant women	
• HIV testing is a part of routine antenatal care and is offered to all pregnant women	
• If a pregnant woman has HIV, she can pass it to her baby	
• Benefits of knowing one's HIV-status, including PMTCT	
3. Explain HIV testing process	
• Confidentiality	
• Client's right to refuse or get tested at a later time	
• Method of HIV testing	
• Meaning of test results	
4. Counsel on discordance and partner testing	
• One partner can be living with HIV while the other is HIV-negative	
• Encourage partner testing and couples counseling	
5. Counsel on HIV prevention and HIV/STI risk reduction	
• High risk of MTCT if she becomes HIV-infected during pregnancy or breastfeeding	

• Practice safer sex (e.g., mutual faithfulness, always using condoms, abstinence)	
• Condoms, challenges to using condoms	
• STI screening, prevention, signs, and treatment	
6. Counsel on PMTCT and having a safe pregnancy	
• Ways to reduce MTCT, including ARVs for mom and baby	
• HIV testing and early treatment for herself, the baby, partner, and family members	
• Attend all antenatal care appointments	
• Deliver baby at a health facility	
• Exclusive breastfeeding (or exclusive formula feeding) for 6 months or as long as possible up to 6 months. Then introducing complementary foods at 6 months.	
• Bring the baby back to the clinic for appointments (immunization, weighing, checkups)	
• Family planning to prevent or space future pregnancies	
7. Offer the client an HIV test	
• If she gives consent (written or verbal, depending on your guidelines), perform HIV test	
• If she refuses, encourage her to think about why and to come back if she has more questions or changes her mind; set up a return visit date	
8. Provide referrals for ongoing counseling or other support, as needed	
9. Ask if she has any questions or concerns	
10. Summarize the session and next steps	

Post-HIV Test Counseling Checklist for HIV-NEGATIVE Pregnant Women

Client's Name: _____ **Client's File#:** _____

TOPIC	TICK
1. Provide test results and give client time to react, give emotional support	
2. Explain window period and encourage retesting	
• Retesting in 6 weeks if there was possible exposure to HIV in past 6 weeks	
• Encourage repeat testing after 34-36 weeks gestation or during labor and delivery	
3. Counsel on disclosure, discordance, and partner testing	
• Who will she share the results with?	
• Her test does not tell us if her partner has HIV	
• Encourage partner testing and couples counseling	
4. Counsel on HIV prevention and HIV/STI risk reduction	
• High risk of MTCT if she becomes HIV-infected during pregnancy or breastfeeding	
• Practice safer sex (e.g., mutual faithfulness, always using condoms, abstinence)	
• Condoms, challenges to using condoms	
• STI screening, prevention, signs, and treatment	
5. Counsel on plans to keep herself and family healthy	

• Attend all antenatal care appointments	
• Deliver baby at a health facility	
• Exclusive breastfeeding for 6 months or as long as possible up to 6 months	
• Bring the baby back to the clinic for appointments (immunization, weighing, checkups)	
• Family planning	
6. Provide appropriate referrals and take-home information, if needed	
7. Ask if she has any questions or concerns	
8. Summarize the session and next steps, including the next clinic appointment date	

Notes:

_____

Date of next counseling session/clinic appointment:_____

Counselor's signature: _____ Date: _____

Post-HIV Test Counseling Checklist for

HIV-POSITIVE Pregnant Women

Client's Name: _____ **Client's File#:** _____

TOPIC	TICK
1. Provide test results and give client time to react, give emotional support	
2. Discuss any concerns the woman has about her own and her baby's health	
3. Discuss PMTCT basics	
• Not all babies will become HIV-infected	
• Can lower the chances that baby will be HIV-infected by getting care at the clinic, taking ARVs, and safely feeding the baby	
4. Counsel on staying healthy and PMTCT during the pregnancy	
• Come back to the clinic for all appointments during pregnancy and after delivery	
• Importance of emotional support from family and friends	
• CD4 testing and meaning of results	
• ARVs or ART and importance of starting early and adherence	
• Disclosure - who will she share the results with?	
• Partner testing, testing other children	
• Safer sex (e.g., mutual faithfulness, always using condoms, abstinence)	
• Preventing and early treatment of opportunistic infections	
• Nutrition and hygiene	
5. Counsel on safe delivery	
• Plan to deliver at a health facility	
• Tell the health worker your HIV-status and medicines you are taking	
• ARVs for mom and baby during labor and delivery	
6. Counsel on infant feeding and help her choose an appropriate feeding method	
• Exclusive breastfeeding for 6 months, or as long as possible up to 6 months	
• Exclusive formula feeding for 6 months	
• Dangers of mixed feeding in the first 6 months	
• Avoiding early weaning	

• Add complementary foods at 6 months, continue breastfeeding	
7. Counsel on plans for her own and baby's care	
• Mom needs lifelong HIV care	
• Importance of getting support from someone she trusts	
• Family planning and safe childbearing in the future	
• Bring the baby back to the clinic for appointments (immunization, weighing, checkups)	
• ARVs and CTX for baby	
• Early infant diagnosis at 6 weeks	
• Care and treatment if the baby is HIV-infected	
8. Provide appropriate referrals and take-home information	
9. Ask if she has any questions or concerns she wants to discuss now	
10. Summarize the session and next steps, including the next clinic appointment	

Notes:

_____

_____

Date of next counseling session/clinic appointment: _____

Counselor's signature: _____ Date: _____

APPENDIX VI: TRANSLATED COUNSELLING FORMS

Pre-HIV Test Counseling Checklist for Pregnant Women

OKUHABURWA KWA'BAKAZI ABINE ENDA OTAKACHEBIRE KAKOOKO KAMUNYWENGYE

(Omwe ninga abeteraine)

Izina ryo'murwaire: _____ **Fayiro yo'murwaire#:** _____

OMUTWE	KYEBERA
1. Yeyanjure agaruke ogambe aha kuhumuriza	
2. Gamba ahabirikukwata ahari sirimu, okujanjara kwayo hamwe n'okwerinda kwayo	
• Ebirikukwata aha sirimu no'kugarukamu ebibujo	
• Emiringo yokujanjara kwakakooko ka sirimu otebirwe okuruga aha nyiina kuza aha mwaana	
• Emiringo yo'kukingira okujanjara kwa akakooko ka kamunywengye otebirwe nan'okukakingira ahagati y'omukazi wenda nan'omwaana.	
3. Okuhaburwa aha burungi bwo'kuchebeza akakooko kamunywengye	
• Tokamanya omuntu oyine akakooko kamunwengye namisho gawe	
• Burimuntu ashemerire kumanya amagara geye okugari ekikwatirine na akakooko kamunywengye namunonga abakazi abenda.	
• Okuchebeza akakooko kamunywengye nikimwe ahabikukorwa omukaziwenda yaba nachebeza enda.	
• Omukaziwenda yaba ayiine akakooko kamunwengye, nabasa kukaturira	

omwanawe.	
• Oburungi bwo'kumanya embera yamagara gawe otebirwe nan'okukakingira ahagati y'omukazi wenda nan'omwaana.	
3. Shoborora emiringo yokuchebeza akakooko kamunywengye	
• Okukuuma ebihaama	
• Obugabe bwo'murwire kwanga ninga kwikiriza kuchebeza bwanyima.	
• Emiringo yo'kuchebeza akakooko kamunywengye	
• Amakuru gebyaruga omukuchebeza	
4. Okuhaburwa kwabashwerine abatakushishanisa emberera yamagara gabo	
• Omukundwa omwe nabasa kuba ayiine akakooko ka munywengye kandi ondijo atakaine	
• Oyige munonga okuchebeza kwabashwereine hamwe boona	
5. Okuhaburwa aha kukingira no'kukyendeeza akakooko kamunywengye	
• Akabii kahango kanyina kuturira omwanawe yaheza kukwatwa akakooko ka munwenygye yaba ayiine enda ningashi yaba nayonsya	
• Mukozese emiringo yokukyendeeza akakooko (ebyokureberaho; okwesigana, okukozesa akapira, obutashambana)	
• Obupiira, okuteganisibwa aha kukoresa obupiira	
• Okuchebeza, okutambira,obumanyiso nan'okuragurira endwara ezikurabira omubushanbani	
6. Okuhaburwa ahakukakingira akakooko kamunywengye ahagati y'omukazi wenda nan'omwaana nokutwaara enda etakwerarikiriza.	

• Emiringo y'okukyendeeza akakooko kamunywengyen otebirwe okukozesa emibazi yakakooko kamunywengye aha mwaana na nyiina.	
• Okuchebeza akakooko ka munywengye no'kweraguriza kare, omwanawe, omushaija we na'ba eka yoona	
• Otayayire eirwariro emirundi yoona wabaoyine enda	
• Ozarire aha irwariro	
• Okuhamwa omwana eibere kumara amezi mukaga ningashi kuhisya aha mezi mukaga nabwanyima kutandikisa omwana ebyokurya aha mezi mukaga.	
• Orete omwana ahairwariro buriijo (kumugyemesa, kumupiima nebindi)	
• Okubaririra oruzaro kukingiza ningashi kutekaho omwanya ahagati yokutwara enda ezindi omubwire bwomumaisho	
7. Higa omurwaire okuchebeza akakooko kamunywengye	
• Ku arayikirize (omubuhandikye ninga omukanwa kurugirira ahabuhabuzi obuwamuha), mukyebere akakooko ka munwengye	
• Ku arayange,muhige kukitekatekaho, kwarabe ayiine ebibuzo ebindi; ohandike ebirobwokwezi ebyoragaruke	
8. Hereza obuhabuzi ahari abo abokuchebeza no'buhwezi obundi nkokubukwetagwa	
9. mubuze kwarabe aine ebibujo ebiindi	
10. Obumbabumbe ebimwagambaho byoona omubufunze	

Post-HIV Test Counseling Checklist for HIV-NEGATIVE Pregnant Women

OKUHABURWA KWA'BAKAZI ABINE ENDA ABATAINE KAKOOKO KAMUNYWENGYE BWANYIMA YO'KUHEZA KUCHEBERA

Izina ryo'murwire: _____ **Fayiro yomurwaire#:** _____

OMUTWE GWE'BYOKUGAMBAHO	**KYEBERE**
1. Hereza abyaruga omukucyebera kandi ohereze omurwaire obwiire kuzigambaho;omuhereze okuhumurizibwa	
2. Mushoborore obwiire obwakakooko kakukuriramu kandi omuhige kugaruka kuchebeza	
• Kugaruka kuchebeza bwanyima yesande mukaga.	
• Muhige kugaruka kuchebeza bwanyima yesande 34-36 yabaayine enda nayazara	
3. Obuhabuzi ahawaragambire,omukundwawe otaine kakooko hamwe nabashwereine	
• Naza kugambaho noha ahabyaruga omukuchebera?	
• Ebyarugamu tibikutugambiro ku omukundwa we ayine akakooko ka munwengye	
• Higa okuchebeza hamwe abashereine	
4. Obuhabuzi ahakukingira no'kukyendeeza akakooko kamunwengye	

• Okweyongyera kwa nyiina kuturira omwanawe hayeza kukwatwa akakoko yaba ayine enda ningashi arikonsya.	
• Kozese emiringo eyokuchingiza akakooko(ebyokureberaho; okwesigangana, kozesa obupira,)	
• Obupiira,okugumirwa omukukozesa obupiira	
• Okuchebeza, okutambira,obumanyiso nan'okuragurira endwara ezikurabira omubushanbani	
5. Okuhabura ahakukuma abekaye nawe batarwaire	
• Otayayire eirwariro emirundi yoona wabaoyine enda	
• Ozarire aha irwariro	
• Okuhamwa omwana ibeere kumara amezi mukaga ningashi kuhisya aha mezi mukaga	
• Orete omwana ahairwariro buriijo (kumugyemesa, kumupiima nebindi))	
• Okubaririra oruzaro	
6. Hereza okumanyisibwa okwihikire erindi eirwariro eryarihemu obuhwezi kyabanikyetagisa.	

7. Mubuze kwarabe aine ebibujo ebiindi	
8. Obumbabumbe ebimwagambaho byoona omubufunze nobwaragaruke omwirwariro kuchebeza	

Ebindi(notes):

_____

Ebiro byokwezi ebyoragaruke kuha obuhabuzi ningashi abwaragaruke omwirwariro kuchebeza:_____

Omukono gwowaha obuhabuzi: _____ Ebiro byokwezi: _____

Okuhaburwa kw'abakazi ebeine enda kandi abarweire kakooko ka munywengye bwanyima y'okuberwa.

Eiziina ry'omurweire: _____ fairo y'omurweire#: _____

OMUTWE	CHEBERA
1. Okuha omurweire ebyaruga omukuchebera kandi okamuhereza obweire kubyetegyereza gye kandi okamuhumuriza	
2. Okuhajaana n'omurweire aha magara gye hamwe n'amagara g'omwana we.	
3. Okuhajaana ebirikukwata ahakubinga akakooko kamunywengye ahagati y'omukazi wenda nan'omwaanawe.	
• Tibaana boona ngu nibeija kukwatwa akakooko ka munywenje	
• Emiringo yo'omwana kukwata akokooko ka munywengye nechendeera kurabira omukutunga abuyambi aha eirwariro, okurya emibazi y'okrwanisa akakooko, kandi n'okureitsagye omwana.	
4. Okuhaburwa aha by'okuguma n'amagara marungi kandi nan'okukingira akakooko kamunywengye waaba oine enda	
• Garuka aha eirwariro kuhikiriza endagano n'abashaho waaba oine enda hamwe na wamara kuzaara	
• Okuhebwa obuyambi n'okuhumuriza kuruga omu banyabuzaare hamwe n'abanywani baawe	
• Okuchebeza obutafari bwomubiri hamwe n'ebyarugamu ekibirikumanyisa	
• Emibazi yakakooko kamunywengye hamwe n'oburungi bwokutandika emibazi omubweire kandi otarikwooshayosha.	
• Okumanyisa – nooha owuwakubasa kuganeira nawe aha byaruga	

omukuchebeza?	
• Okuchebeza omukundwa, hamwe n'okuchebeza abaana abandi	
• Okwekuuma omuby'okuteerana (nka., okwetsigana, okukozesa obupiira, okuruga aha by'omubonano)	
• Okwetantara kandi n'okutunga obujanjabi omubweire aha burweire bwoona	
• Eby'endya hamwe neby'obuyonjo	
5. Okuhaburwa aha by'okuzaara gye	
• Yetekatekyere okuzarira aha eirwariro	
• Gambira omujanjabi nkoku oyemereire omuby'akakooko ka munywengye kandi hamwe n'ebyemibazi ei orikurya.	
• Emibazi yakakooko kamunywengye eyomukazi hamwe n'omwana omukuzaara nabwanyima y'okuzaara	
6. Okuhaburwa aha byendya y'omwana kandi nokuyamba omukazi aha miringo ehikire eyokurya hamwe nokureitsa omwanaa	
• Okuhamya omwana ibeere okumara ameezi mukaga (6), neinga obweire oburikubasika okuhisya ameezi mukaga	
• Okuhamya omwana ibeerekumara ameezi mukaaga	
• Akabi akaryomuganburira omwana ebyokurya atakaherize ameezi mukaga	
• Okwetantara okweiha omwana aha ibeere kare.	
• Okuha omwana obyokurya ebindi ahameezi mukaga, hamwe nokugumizamu orikwonsya	
7. Okuhaburwa aha ntebekanisa aha magarage hamwe n'okureebera omwana.	

• Omukazi nayetenga okurebererwa gye amagaragye goona omubyakakooko ka munywengye	
• Akarungi akari omukutunga obuyambi kuruga ahari omuntu owarikwetsiga	
• Embareirira y'oruzaaro kandi okuzaaragye omubweire obyomumeisho	
• Garuka oreete omwana aha eirwariro okubugana abashaho (Okugyemesa, okurenga, okuchebeza)	
• Emibazi y'akakooko kamunywengye ey'omwana	
• Okuchebeza omwana kare aha sande mukaaga.	
• Okurebererwa hamwe n'okutambirwa kw'omwana yaaba arweire akakooko kamunywengye	
8. Okuha obuhabuzi n'obuhumurizi obuhikire aha marwariro amahango hamwe b'obuhabuzi obwokutwara omumaka	
9. Okubuuza omurweire yaaba aine ebibuuzo byoona ninga ekintu kyoona kuganiiraho hati	
10. Okuta ebimwagambaho omubufunzi kandi n'ebindi ebyokukora harimu n'obu argarukye aha eirwariro	

Ebindi(notes):

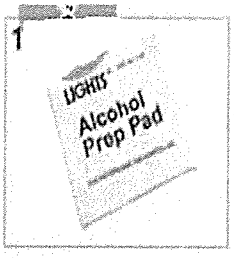
_____

_____

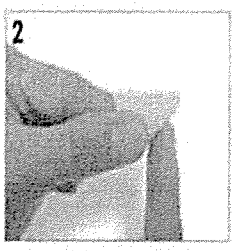
Ebiro by'okwenzi ebyokugaruka aha eirwariro: _____

Omukono gwomuhumuriza: _____ **Ebiro:** _____

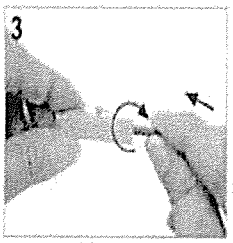
APPENDIX VII: ILLUSTRATION FOR RAPID HIV TESTING.



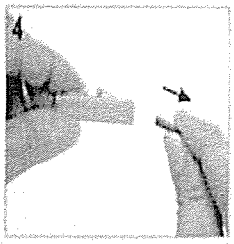
Tear open the Alcohol Prep Pad



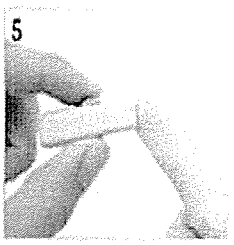
Clean your finger



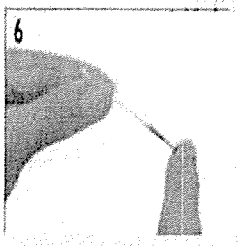
Push in and twist the knob of the Lancet



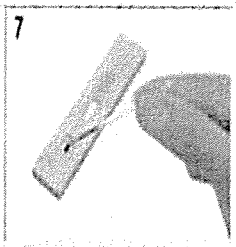
Pull out the knob



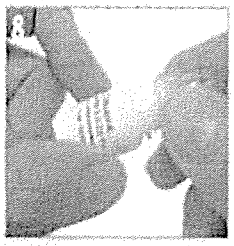
Place the Lancet at the finger and press the trigger to prick the finger



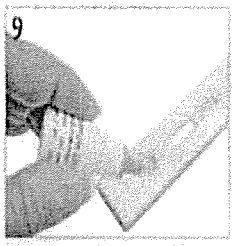
Collect about 1 to 2 drops of blood sample using Micro Pipette



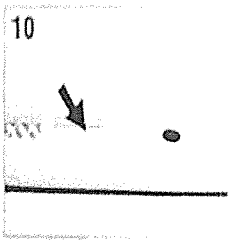
Place about 1 drop of blood sample into the Sample Well using the Micro Pipette



Open the cap of the Diluent Bottle

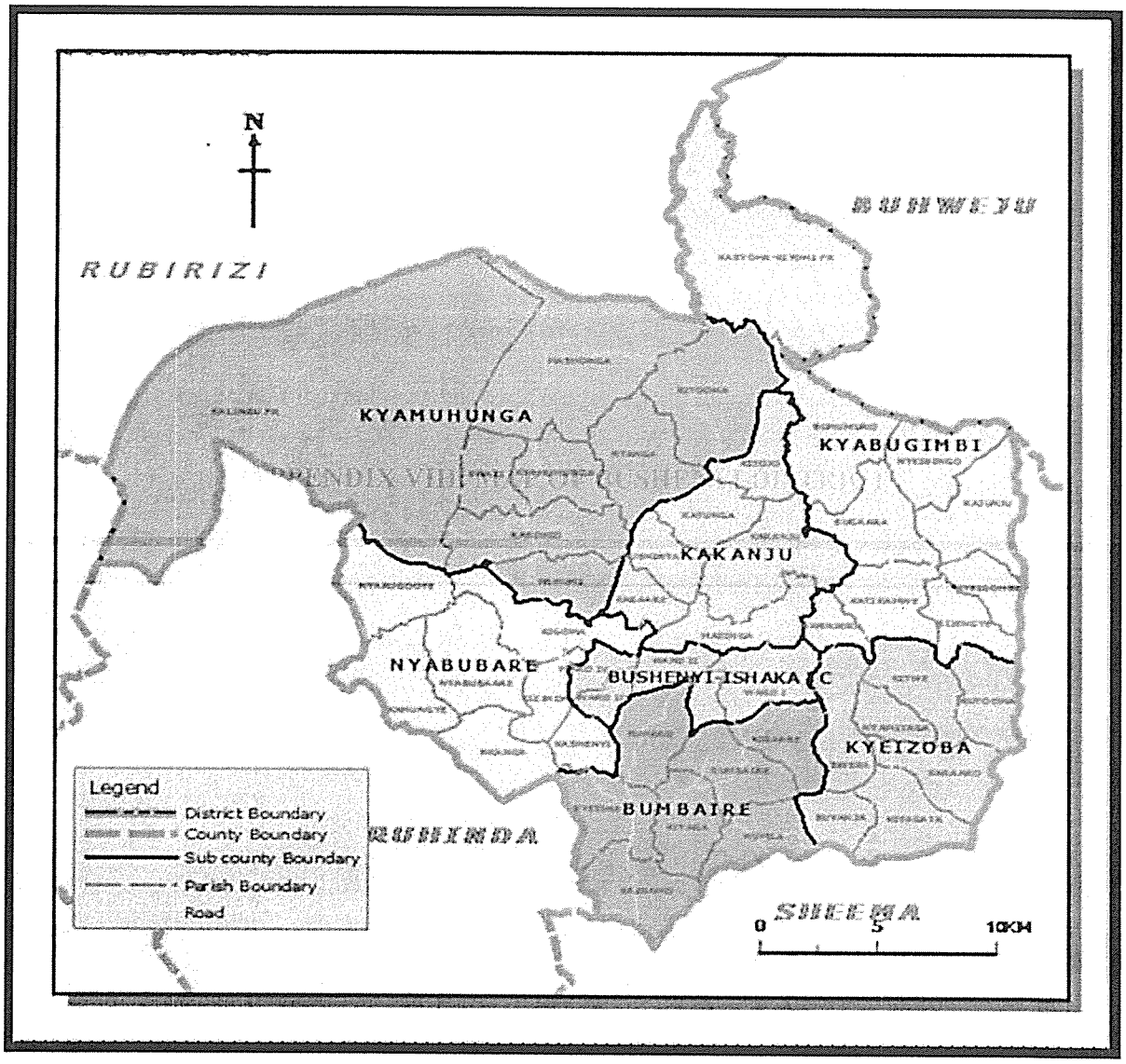


Place about 2 - 4 drops of Diluent Liquid into the Sample Well slowly *(Make Sure The Liquid Touches The Control Line)*

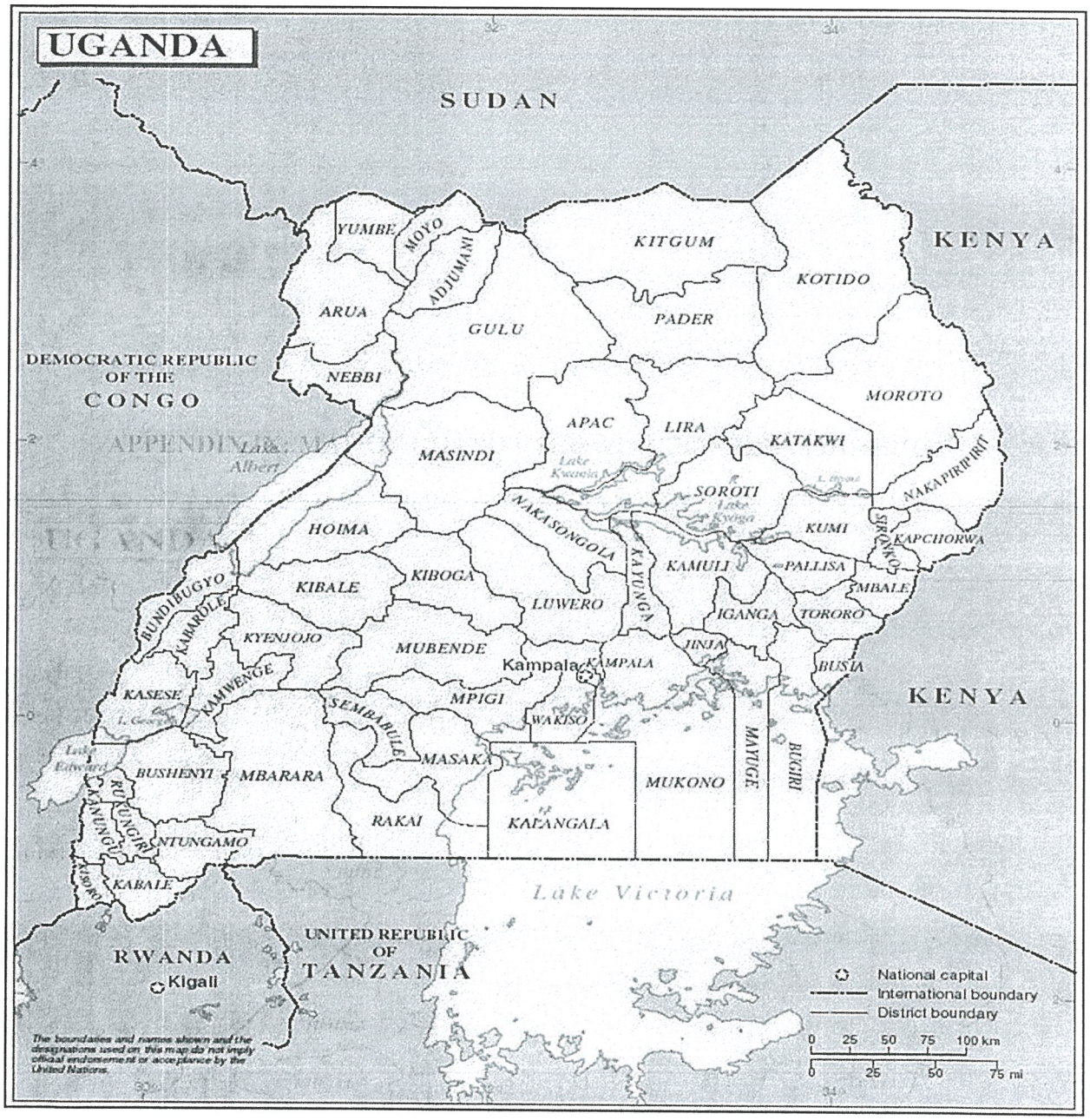


Read results within 10 minutes

APPENDIX VIII: MAP OF BUSHENYI DISTRICT



APPENDIX IX: MAP OF UGANDA SHOWING BUSHENYI DISTRICT



KAMPALA
INTERNATIONAL
UNIVERSITY

Western Campus
P.O. Box 71, Bushenyi
Tel: 0392661215, 0772661073

POSTGRADUATE STUDIES & RESEARCH DIRECTORATE (PGSRD)

17th April, 2018

TO

Dr.Farhiya Mohammed

REG. No MMED/2583/153/DF

LETTER OF APPROVAL

This is to certify that the research proposal entitled *"Missed Opportunity to Human Immunodeficiency Virus Testing Among Mothers Delivering at Kampala International University Teaching Hospital"* was reviewed by the Research Subcommittee of the Board of Postgraduate Studies and Research Directorate of Kampala International University-Western Campus (KIU-WC) in its meeting on 23rd January, 2018 for its Scientific Validity and Ethical appropriateness and was approved subject to minor corrections.

This proposal was finally approved on 17th April, 2018 after the expedited review following the execution of minor corrections. You are required to proceed to KIU Research Ethics Committee for the final approval before data collection

Wishing you all the best

Signed by:

Dr.Twinamatsiko Medard Katonera

Chairman, Research Sub-Committee

Date/Stamp

KAMPALA
INTERNATIONAL
UNIVERSITY

Western Campus
P.O BOX 71 Ishaka, Uganda
Tel: +256 758 696 775
Email: kiurec2017@kiu.ac.ug
Website: www.kiu.ac.ug

RESEARCH ETHICS COMMITTEE (REC)

Our ref: SP201805 04 JULY 2018

FARHIYA MOHAMMED
Principal Investigator

APPROVAL OF YOUR PROPOSAL

Submitted Proposal: "MISSED OPPORTUNITIES FOR HUMAN IMMUNODEFICIENCY VIRUS TESTING AMONG MOTHERS DELIVERING AT KAMPALA INTERNATIONAL UNIVERSITY TEACHING HOSPITAL, UGANDA" Nr UG-REC- 023/201805

Reference is made to the above Protocol, which you submitted to the Research Ethics Committee (REC) for ethical review and approval. It has been noted that all the concerns raised earlier by the Committee, in its meeting of 06th June 2018, have been properly responded to.

This is, therefore, to inform you that your study has been approved, following an Expedited Review. You may now proceed with preparations to implement the research. Please note that this approval is for a period of one year.

As Principal Investigator, you are expected to fulfill the following conditions, which are part of the approval process regarding your study.

1. You are required to register the Protocol with the Uganda National Council for Science and Technology, according to the guidelines of the Council, for final clearance to undertake the research.

2. Any changes/amendments and or additions to the Protocol, Consent Form and/or Data Collection Tools must be submitted to the REC for review and approval prior to activation of the changes.

3. Reports of unanticipated problems involving risks to participants should be submitted to REC.

4. Only the approved Consent Forms should be used in enrolling participants. For that purpose, therefore, you should retain all signed Consent Forms on file.

KIU RESEARCH ETHICS COMMITTEE (REC)
APPROVED
VALID UNTIL
11 JUL 2019
P.O. Box 71, Ishaka - Uganda

KAMPALA
INTERNATIONAL
UNIVERSITY

Western Campus
P O BOX 71 Ishaka, Uganda
Tel: +256 758 096 775
Email: kurec2017@kiu.ac.ug
Website: www.kiu.ac.ug

RESEARCH ETHICS COMMITTEE (REC)

5. In order to continue with the study beyond the approved period, a Continuing Review Application must be submitted to the REC ten weeks prior to the indicated expiration date of the approval.

The documents approved in this Application Process are listed below:

Document	Language	Version
Protocol	English	Version 3
Protocol Application Form	English	Version 1
Data Collection Tools (Questionnaire)	English	Version 3
Informed Consent Document	English	Version 3

KIU RESEARCH ETHICS COMMITTEE (REC)
APPROVED
VALID UNTIL
04 JUL 2019
P.O. Box 71, Bushenyi - Ishaka

Dr. Patrick Mbyemeire
Ag. KIU REC CHAIRPERSON