



**THE UNIVERSITY OF ZAMBIA**

**SCHOOL OF MEDICINE**

**KNOWLEDGE, ATTITUDES AND PRACTICES ON PREVENTION OF  
MOTHER TO CHILD TRANSMISSION OF HIV AMONG HEALTH CARE  
PROVIDERS AT UNIVERSITY TEACHING HOSPITAL AND IN THE LUSAKA  
URBAN CLINICS**

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**A Dissertation submitted to the University of Zambia in partial fulfillment of the requirement for  
the degree of Master of Medicine in Obstetrics and Gynaecology.**

**2010**

## **DEDICATION**

I dedicate this work is to my children Kasonde, Mwinji, and Mpasu.

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helped during the proposal development and understanding of research methodology.

Lastly but not the least I would like to acknowledge the support and encouragement of  
my family who have always believed in me.

## STATEMENT

I HEREBY STATE THAT THIS DISSERTATION IS ENTIRELY THE RESULT OF MY OWN PERSONAL EFFORT. I HAVE CLEARLY INDICATED THE VARIOUS SOURCES TO WHICH I AM INDEBTED IN THE REFERENCES AND ACKNOWLEDGEMENTS.

SIGNED:.....

DR. T. NKOLE

## DECLARATION

I DECLARE THAT THIS DISSERTATION HEREIN PRESENTED FOR THE DEGREE OF MASTER OF MEDICINE IN OBSTETRICS AND GYNAECOLOGY HAS NOT BEEN PREVIOUSLY SUBMITTED EITHER WHOLLY OR IN PART FOR ANY OTHER DEGREE AT THIS OR ANY OTHER UNIVERSITY NOR IS IT BEING CURRENTLY SUBMITTED FOR ANY OTHER DEGREE.

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## **APPROVAL**

THIS DISSERTATION OF DR. THERESA NKOLE IS APPROVED AS FULFILLING PART OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF MEDICINE IN OBSTETRICS AND GYNAECOLOGY BY THE UNIVERSITY OF ZAMBIA.

SIGNATURES:

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## ABBREVIATIONS

<b>3TC</b>	:	Lamivudine
<b>AIDS</b>	:	Acquired Immune Deficiency Syndrome
<b>ANC</b>	:	Antenatal Care
<b>ANRS075</b>	:	Agence Nationale de Recherché sur la SIDA (ANRS) 075.
<b>ART</b>	:	Antiretroviral Therapy
<b>ARM</b>	:	Artificial Rupture of Membranes
<b>ARV</b>	:	Antiretroviral
<b>AZT</b>	:	Zidovudine
<b>CBOH</b>	:	Central Board of Health
<b>CD4</b>	:	Cluster of Differentiation 4
<b>CME</b>	:	Continuing Medical Education
<b>CSO</b>	:	Central Statistical Office
<b>HIV</b>	:	Human Immune Deficiency Virus.
<b>KAP</b>	:	Knowledge Attitudes and Practice
<b>LUDHMT</b>	:	Lusaka Urban District Health Management Team
<b>MDG</b>	:	Millennium Development Goal
<b>MOH</b>	:	Ministry of Health
<b>MTCT</b>	:	Mother to Child Transmission
<b>NAC</b>	:	National Aids Council
<b>PACT076</b>	:	Paediatric AIDS Clinical Trial Protocol Study Group 076
<b>PCR</b>	:	Polymerase Chain Reaction
<b>PMTCT</b>	:	Prevention of Mother to Child transmission
<b>SPSS</b>	:	Statistical Package for Social Sciences
<b>UNAIDS</b>	:	United Nations AIDS Program
<b>UNICEF</b>	:	United Nations Children's Fund
<b>UTH</b>	:	University Teaching Hospital
<b>VCT</b>	:	Voluntary Counseling and Testing
<b>WHO</b>	:	World Health Organization
<b>ZDHS</b>	:	Zambia Demographic and Health Survey

## ABSTRACT

**Background:** In most developed countries HIV testing, use of antiretroviral drugs (ARVs) and modification of feeding practices have greatly reduced the rate of mother to child transmission (MTCT) of HIV-1 though this is not the case in many African countries. In Zambia, prevention of mother to child transmission (PMTCT) services has been introduced in nearly all public health institutions. Proper implementation of these services however, requires adequate knowledge and appropriate attitudes and practices (KAPs) on the part of the healthcare providers. The objective of this study was to assess the KAPs regarding PMTCT among healthcare providers at the University Teaching Hospital and in Lusaka Urban Clinics.

**Methodology:** This was an interviewer-administered questionnaire-based cross sectional study conducted at the University Teaching Hospital's Department of Obstetrics and Gynaecology as well as in Maternal and Child Health and maternity departments of four randomly selected clinics in the Lusaka Urban District, namely: Chilenje, Mtendere, Matero Reference, and George clinics. The participants were doctors, midwives, and general nurses in these facilities. Information was obtained on interventions for prevention of mother to child transmission (PMTCT) of HIV, negative and positive attitudes towards PMTCT, willingness to care for HIV infected pregnant women, practice of known interventions for PMTCT and perception of risk of acquiring occupational infection by the healthcare providers.

**Results:** Knowledge levels on PMTCT was variable (mean composite scores were in the 60-70% range, though only 45% knew of the risk during delivery and 19% through breastfeeding; almost 50% knew of an ARV prophylaxis regimen and 63% when to initiate ARVs). There was no statistically significant difference in mean scores by facility (UTH/Clinics), though younger, university trained providers (doctors) had better knowledge. Attitudes towards PMTCT were good (95%). Most providers (98%) were willing to care for HIV infected women and were not afraid of occupational infection. Ninety nine percent perceived the PMTCT programme to be very important. However they felt that there was not enough time to give to PMTCT (53.6%). This was possibly due to staff shortages. Most (80%) of the providers interviewed perceived the workload associated with PMTCT to be too much. The practice of PMTCT interventions was acceptable (89.3 percent offering voluntary counseling and testing; 93 percent offered ARVs for prophylaxis and 86.4 percent offering infant feeding counseling). Although caesarean section was not in the Zambian guidelines for PMTCT, 98.6 percent said they offered it as an option for delivery. However only 44.3 percent reported that they were offering safer obstetric practices and only 40.7 percent offered PCR testing.

**Conclusion:** The study showed gaps in knowledge, attitudes, and practice on PMTCT amongst health care providers at UTH and in Lusaka urban clinics. Without further training and increase in staffing levels, the quality of and access to PMTCT services will likely be negatively impacted.

## **Introduction**

Globally, about forty million people are currently living with HIV (UNAIDS 2006i). This is about one percent of the world population. In 2006, there were about 4.3 million new HIV infections worldwide. Of the total number of AIDS patients globally 48 percent are women with 59 percent in sub Saharan Africa (UNAIDS 2006ii, Avert 2007). AIDS has killed about 25 million people worldwide since 1981 (UNAIDS 2006i). The impact of AIDS in Zambia has led to a reduction in the average life expectancy to 49 years. This is 13 years less than before the pandemic (MOH 2005). In 2005, there were 540,000 new HIV infections in children. Ninety percent of these were in sub-Saharan Africa (WHO 2005). Vertical transmission, as mother to child transmission (MTCT) is the main mode of transmission in children. In the absence of intervention, 15-30 percent of children born to HIV-infected women are likely to be infected, though the risk of MTCT can be reduced to less than 2 percent with interventions that include caesarean section, antiretroviral drugs, and avoidance of breastfeeding (WHO 2005).

Zambia has a population of 10.3 million (CSO et al 2000). The prevalence of HIV in the Zambian adult population was estimated to be 16 percent in the 2001 Zambia Demographic and Health Survey (ZDHS) (CSO et al 2003) and was 14.3 percent in the 2007 ZDHS (CSO et al 2009). Of the total adult infections, 57 percent occur in women (Avert 2007). Twenty five percent of pregnant women are HIV positive (CSO et al 2003). The prevalence of infection is higher in urban and lower in the rural areas. The last Zambia Antenatal Clinic Sentinel Surveillance Report (MOH, CBOH, GRZ, 2005) reports the mean HIV prevalence to be 25 percent for urban and 11.8 percent for rural areas with a mean of 19 percent. In the absence of intervention, 39 percent of children born to these women will be infected with HIV. Of the approximately 40 percent overall transmission rates, 5-10 percent will be infected in pregnancy, 20 percent in labour, 5-10

percent through breastfeeding (MOH 2005). Given the high prevalence and transmission risk, of the 520,000 babies born annually in Zambia about 41,000 will acquire HIV infection. This is about 112 new infections in babies per day (MOH 2005). HIV accounts for 10 percent of infant mortality throughout Africa, the range being 5-60 percent (WHO 2005). Zambia's infant mortality rate was estimated to be 102 per 1000 live births in 2005 (UN data). The infant mortality had dropped from 126 per 1000 in 1960 to 90 per 1000 in 1980 but has shown an upward trend since the onset of the AIDS epidemic which commenced in the 1980s. Most of this excess mortality was due to HIV and MTCT had reversed the child survival gains of the past decades. The 2007 ZDHS reports an infant mortality (for the preceding 5 years) to be 70 per 1000 livebirths reflecting improved child survival strategies, including PMTCT (CSO et al 2009).

The Zambia PMTCT programme started as a pilot project in 1998 with collaboration between Ministry of Health and UNICEF. It was initially in three sites, with each district including a hospital and a health center as follows: UTH and Chipata Clinic in Lusaka, Monze, Mission Hospital and Kembe Rural Health Center in Southern Province and Mbala General Hospital, and Tulumane Rural Health Center in Mbala Northern Province.

Based on the successes recorded by the project, the PMTCT program was adopted by the government in 2002. By October 2003, there were 74 PMTCT sites in six provinces of Zambia. Lusaka had 23 PMTCT sites managed by the Lusaka Urban District Health Management Team in partnership with the Elizabeth Glaser Paediatric Aids Foundation 'Call to Action' programme.

The Central Board of Health (CBOH) developed the PMTCT policy document and guidelines. The aim was to train 72 trainers for PMTCT-eight per province.. The 2006 Zambian guidelines for PMTCT have adopted an 'Opt Out' approach to counseling and

testing for HIV (MOH, NAC, 2006). This means that HIV is a routine test conducted in antenatal clinic (ANC). However, the women have an option to refuse the test if they so wish. Counseling in the PMTCT programme is carried out both as group and individual counseling. Women who test negative are tested again in the third trimester. Women are tested using Rapid HIV testing kits so that mothers get their results on the same day. A CD4 test is done for those who test HIV positive, and if the client meets criteria for therapy, they are referred to the Antiretroviral Therapy (ART) programme in the health centers. Those not requiring therapy but are positive are given prophylaxis according to the recommendations in Table 1. The shaded area in the table represents the Zambian PMTCT guidelines at the time of the study (MOH, NAC 2006).

In the intrapartum period modified obstetric and midwifery practices are encouraged. These include avoidance of prolonged rupture of membranes and artificial rupture of membranes, avoidance of episiotomy unless medically indicated and avoidance of instrumental delivery unless medically indicated. Elective caesarean section prior to onset of labour is useful but not feasible in Zambia. In the postnatal period, the baby and mother should get the ARVs as per protocol. In addition, optimal feeding practices are recommended. If the HIV positive woman finds replacement feeding acceptable, affordable, feasible, sustainable, and safe then she should avoid breastfeeding altogether. Exclusive breastfeeding for 3-6 months with abrupt cessation is recommended for those who do not meet these requirements (MOH, NAC 2006).

Paediatric components of PMTCT include administration of the Paediatric PMTCT package, as indicated in Table 1, as well as cotrimoxazole administration to the infant, support and adherence to feeding options, routine pediatric vaccinations and testing of newborn for HIV (MOH, NAC 2006).

**TABLE1: Anti-Retroviral Prophylaxis Regimens to Prevent Mother to Child Transmission**

<b>Course</b>	<b>Antenatal</b>	<b>Intrapartum</b>	<b>Postnatal</b>
<b>Zidovudine (ZDV) and Niverapine (NVP)</b>	<b>Mother:</b> ZDV 300mg Twice a day starting at 32 weeks or as soon as possible thereafter	<b>Mother:</b> ZDV 600mg at onset of labour and every 6 hours until delivery.  NVP 200mg single-dose at onset of labour.	<b>Infant:</b> NVP 2mg/kg oral suspension immediately after birth and ZDV 4mg/kg twice a day for 7 days starting immediately after birth.  <b>Mother:</b> ZDV 300mg twice a day for 7 days
		<b>Or</b> ZDV 600 mg at onset of labour and single dose NVP 200 mg at onset of labour.	<b>Or</b> <b>Infant:</b> NVP 2 mg/kg oral suspension immediately after birth.
<b>ZDV</b>	<b>Mother:</b> ZDV 300 mg twice a day from 32 wks or as soon as possible thereafter.	<b>Mother:</b> ZDV 600 mg at onset of labour or ZDV 300 mg at onset of labour and every 3 hours until delivery.	<b>Infant:</b> ZDV 4 mg/kg twice a day for 7 days.  <b>Mother</b> ZDV 300mg twice a day for 7 days
<b>ZDV and NVP</b> when mother has received less than 4 weeks of ZDV or ART before delivery.		<b>Mother:</b> ZDV 600mg at onset of labour and every 6 hours until delivery NVP 200mg single-dose at onset of labour.	<b>Infant:</b> NVP 2 mg/kg oral suspension immediately after birth and ZDV 4 mg/kg twice a day for 14 days. <b>Mother</b> ZDV 300mg twice a day for 7 days
<b>ZDV and NVP</b> when mother has received no ARV prophylaxis.		<b>Mother</b> ZDV 600mg at onset of labour and every 6 hours until delivery. NVP 200 mg single-dose at onset of labour.	<b>Infant:</b> NVP 2 mg/kg as soon as possible after delivery and ZDV 4 mg/kg twice a day for 28 days. <b>Mother</b> ZDV 300mg twice a day for 7 days
NVP	None	<b>Mother:</b> Single-dose NVP 200 mg at onset of labour.	<b>Infant:</b> NVP 2mg/kg oral suspension immediately after birth.

Source: *Generic Training Package, Pocket Guide, WHO, 2004* (Shaded area indicates the Zambian PMTCT guideline as at 2006).

## **Literature Review**

In 2005, an estimated 540,000 children were newly infected with HIV (MOH 2005, UNAIDS 2006i, Avert 2007). Ninety percent of these were in sub Saharan Africa (UNAIDS 2006ii). Vertical transmission (MTCT) is the main mode of transmission in children. In the absence of any intervention, 15-30 percent of children are infected though with intervention, the risk is reduced to less than 2 percent (WHO 2005). The interventions include anti retroviral therapy, elective caesarean section, avoidance of breastfeeding, as well as avoidance of obstetric practices that may increase the baby's exposure to maternal fluids and blood at delivery. The complete PMTCT package includes comprehensive ANC care, modified obstetric practices, ART, infant feeding and counseling, care and support.

MTCT of HIV reverses the gains of the past decades in child survival. Mortality due to HIV is greater than 50 percent by 2 years of age and mortality of infants is affected by mother's status regardless of whether they are born infected or not (Kuhn et al 2000). HIV has resulted in an increase in infant mortality rate in most developing countries. It is responsible for about 10 percent of child deaths in sub Saharan Africa (WHO 2005) and likely to undermine achievement of the Millennium Development Goal 4 (reducing child mortality). Thus, proper implementation of PMTCT will help reduce excess mortality due to HIV. WHO recommends a four-pronged approach to PMTCT (UNAIDS 2006i, UNAIDS 2006ii). These include primary prevention, prevention of unintended pregnancies among HIV positive women, PMTCT, and finally care and support of infected women, infants and families.

In 1994, American and French researchers through the ACTG076 trial showed for the first time that an antiretroviral (Zidovudine [AZT] in this case) in pregnancy could reduce the risk of MTCT (Connor et al 1994). The study showed that AZT from 14

weeks of pregnancy then 6-hourly in labour and given for 6 weeks to the baby after delivery reduced the risk of infection in infants by sixty seven percent. Later studies in Thailand showed that AZT given to the mother from 36 weeks reduced transmission by 50 percent (Nightingale 2006). The simplest regimen so far is the HIVNET012 regimen in which a single dose of nevirapine 200mg is administered to the mother at the onset of labour and single dose niverapine 2mg/kg is administered to the baby within 72 hours of delivery (Ndauti et al 2000). This showed a reduction of 47 percent at 6 weeks. Data from Thailand revealed that AZT from 28 weeks with single dose nevirapine to mother and infant reduced infection by 80 percent (Lallemant et al 2004). Various other trials have been done to try to see what interventions will reduce MTCT especially in resource-constrained situations and combination therapies of AZT with 3TC in various regimens have been used. Currently several ARV regimens for PMTCT are being followed by different countries depending on their resources. The ANRS075 regime compared AZT with 3TC to the mother from 32 weeks and to the infant for 6 weeks. It showed a reduced transmission from 6.8-1.6 percent at 18 months (Nightingale 2006). WHO recommendations for ARV prophylaxis to prevent MTCT for resource-constrained countries are as outlined in Table 1.

Breast milk transmission is a major component of MTCT of HIV. A randomized trial in Uganda demonstrated a risk attributed to breast milk transmission of 44 percent (Ndauti et al 2000). Seventy-five percent of these infections were in the first 6 months of life. Magoni et al (2005) also demonstrated that HIV transmission was significantly lower in formula fed than in breastfed and mixed fed infants in a study in Uganda. Various feeding options have been associated with different degrees of MTCT of HIV. In the absence of any antiretroviral prophylaxis, with long duration of breast-feeding, (18-24 months) the risk has been shown to be about 35 percent (De Cock 2000). With short

duration (6 months) of breast-feeding and no intervention, the risk of transmission is 30 percent. Without intervention and with replacement feeding, the risk is 20 percent (De Cock 1999).

For resource-poor settings exclusive breast-feeding for 4 to 6 months with abrupt cessation is recommended (WHO 2005). Table 2 illustrates the risk of HIV transmission with different interventions (De Cock 1999).

Table 2. Risk Of Mother to Child Transmission with various Interventions

Intervention	Risk of transmission
No intervention	30 %
Stop breastfeeding	15 %
Monotherapy (AZT or single dose NVP)	8 %
AZT + single dose NVP	2 %
Triple therapy	< 2 %

Adapted from De Cock et al. 2000 (UNAIDS Technical report)

The entry point for PMTCT is knowledge of ones HIV status. Thus, counseling and testing is a major component in provision of PMTCT services. However, there is fear of stigma and discrimination. WHO recommends that confidentiality is a prerequisite in VCT and PMTCT counseling (WHO 2005). This underscores the need of right attitudes among the healthcare providers. Implementation of PMTCT in Zimbabwe (especially VCT) are easily integrated into existing MCH services, even in rural centers, though staff constraints and inadequate infrastructure results in failure of women accessing PMTCT and failure in treatment can be due to missed opportunities rather than treatment failure (Perez et al 2004). This emphasizes the importance of good quality counseling and testing in PMTCT provision. Abiodun et al (2007) in Nigeria demonstrated the need to improve the quality of PMTCT counseling and found that awareness of HIV/AIDS

among women attending ANC was high but the knowledge on PMTCT was found to be inadequate. The time dedicated to PMTCT counseling seems to be inadequate compared to the heavy and comprehensive load of information and advice women receive. Delva et al (2006) in a PMTCT implementation study in Mombasa, Kenya, found that there is a need for ample pre and posttest counseling, and follow up for optimal effectiveness of PMTCT. Jones et al (1998) in a study in London, England to see whether uptake of antenatal HIV testing depended on the individual midwife, showed that duration of pretest counseling and counseling by older and more experienced midwives resulted in better uptake of HIV screening in ANC.

Comprehensive training improves PMTCT delivery (Musuyu et al 2004). There is a need for capacity building to provide a cadre of health care providers with updated knowledge and clinical skills (Nizova 2004). A study on implementation of PMTCT programs identified that lack of attention to motivating staff to prioritize HIV infection led to ineffectiveness of the program (Ikeda et al 2004). Delva et al (2006) recognized that successes scored in PMTCT in study situations did not match results in actual implementation programmes.

Labour and delivery presents another entry point for PMTCT and interventions that reduce MTCT include caesarean section, vaginal cleansing with antiseptic, and avoidance of obstetric practices that expose the baby to maternal fluids and blood. These interventions include avoidance of early rupture of membranes, avoidance of unnecessary episiotomies and instrumental deliveries. With adequate intervention, the risk of MTCT is reduced to about one to two percent. Caesarean section has been shown to reduce MTCT when done at 38 weeks before onset of labour. However, in a woman with a low viral load of less than 1000 copies per ml it may not confer significant benefit (Read 1999).

There are few studies on knowledge, attitude and practice (KAP) of PMTCT of healthcare providers. However, there are several on HIV/AIDS in general. Most of the findings of these studies should be true for the PMTCT situation as well. Tan et al (1999) in Singapore found that most obstetricians were uncomfortable (58.5%) and felt incompetent (85.5%) to manage HIV. An assessment of obstetricians risk assessment and counseling of their patients on HIV risk in an Australian study revealed a need of continuing medical education (CME) to improve knowledge and skills of managing HIV (Bokeloo et al 1993). In Kentucky, USA, Brachman et al (1996) found that nearly all clinicians were offering antenatal testing but there was poor follow up. In addition, limited knowledge of disease and care of HIV as it relates to pregnancy was recognized and a need for CME was identified.

Lack of knowledge was identified as a barrier to offering HIV testing in ANC. In a multicenter study done in USA, Canada, Thailand, and India, knowledge scores were 83, 84, 93, and 92 percent respectively (Brachman et al 1996). Knowledge levels were directly related with previous contact with HIV patients. A need for increased education was recognized. In Madagascar, poor scientific knowledge was noted among healthcare providers surveyed (Hentgen et al 2002). A Nigerian study showed a high knowledge level but with wrong knowledge. Inadequate education, lack of protective clothing and treatment materials were recognized as contributing to poor attitude and practices (Aisien and Shobowale, 2005). Ndikom and Onibokin (2007) found that there was a positive relationship between knowledge and behavior among midwives ( $r=0.583$ ,  $p=0.06$ ). Their study in Nigeria also revealed that major factors affecting behaviour were fear of getting infected, irregular supply of resources such as gloves, goggles, sharp boxes and water. The study thus showed a significant relationship between behaviour and availability of resources. A need for structured education, resources for practice and improvement of

environment was recognized. It was further seen that knowledge levels of midwives who had educational exposure was not different from those who did not have ( $p=0.152$ ). However those who had previous experience with handling HIV patients had better knowledge ( $p=0.03$ ). Harms et al (2005) also reported similar findings in their study on MTCT prevention, awareness and knowledge in Uganda and Tanzania. They found that level of comfort in caring for HIV infected patients and HIV knowledge scores varied directly with previous contact with HIV patients. They recognized a need for increased education of healthcare providers.

Level of knowledge has also been seen to be influenced by level of formal education attained, length of practice, gender and attendance of refresher courses on HIV/AIDS ( $p<0.05$ ) though age, religion and occupation had no influence on attitude ( $p>0.05$ ) (Adebajo et al 2003). However, a study in England on the impact of HIV awareness programme on midwives revealed no significant difference in knowledge levels between those who had received training and those who had not (Bennet and Weale 1997). This contradicts most literature. In their study, it was felt that the training offered needed to be reviewed. A PMTCT programme in Guatemala was found to be ineffective because of failure of healthcare providers to prioritize HIV infection (Ikeda, 2004). From the studies reviewed, practice of PMTCT seems to be poor in most centers. It does not seem to match the knowledge levels, which are mostly acceptable. Significant negative attitudes have also been identified and a need to deal with the affective component of HIV, if programmes are to be successful.

Discriminatory attitudes have been identified with some healthcare providers indicating that women who are aware of their HIV positive status should not get pregnant. Others feel that the patients with HIV are immoral and deserve the condition. Some healthcare

providers indicated that they would be uncomfortable delivering HIV infected women (Fusilier et al, 1998, Adebajo et al 2003, Reis et al 2005 and Misiri et al 2008). From the studies reviewed, it is evident that there is a need to improve education on PMTCT and possibly revise training programmes.

This study on PMTCT at UTH and in the Lusaka Urban clinics aimed to help identify the specific areas in the programme that need to be improved. Previous studies on knowledge, attitude, practice on PMTCT have been mainly on the general public but very little have been on health providers.

## **Study Justification**

Given the magnitude of the problem of MTCT and the potential benefit of adequate interventions, adequate knowledge on PMTCT and correct attitude and practices are imperative. These translate into benefit for both mother and infant reducing both infant and maternal mortality. Knowledge, attitudes and practice (KAP) are identified as key elements that drive healthcare providers decision-making about medical care (Krist 2005). An assessment of attitudes, practices and knowledge of health care providers will help identify gaps in the PMTCT service at UTH and Lusaka district. This will allow implementation of measures to improve PMTCT delivery. A report from a PMTCT implementation study in Mombasa, Kenya points at an important gap between the efficacy in clinical trial circumstances and PMTCT programmes when implemented in real life (Delva et al 2006). This KAP study will help assess the effectiveness of the programme. Previous studies have been mainly on the patients but very few have been on health providers. This study will endeavor to assess the knowledge attitudes and practices on PMTCT at UTH as well as some selected clinics in the Lusaka urban district in order to identify areas of improving the service and training needs for the healthcare providers. The findings of this study can be used in helping to improve our PMTCT delivery at UTH and in the Lusaka Urban District Clinics.

## **Research Question**

What is the knowledge, attitudes and practices on PMTCT among healthcare providers at UTH and in selected Lusaka Urban clinics?

## **Hypothesis**

The knowledge, attitudes and practices on PMTCT among healthcare providers at UTH and in the Lusaka Urban District clinics is poor.

## **Objective of the Study**

To explore the knowledge, understanding and the practice of PMTCT by healthcare providers at UTH and in the Lusaka urban clinics.

### **Specific Objectives:**

1. To determine what PMTCT interventions are offered by different healthcare providers.
2. To assess the knowledge of healthcare providers of the available interventions for PMTCT.
3. To assess the practices around PMTCT of the healthcare providers.
4. To study the attitudes of healthcare providers to PMTCT.

## **Methodology**

### **Study Design**

This was a cross sectional study of healthcare providers' knowledge, attitudes and practice (KAP) regarding PMTCT. The healthcare providers were those working in the department of Obstetrics and Gynaecology and in maternity departments of the clinics in Lusaka district and data was obtained using an interviewer-administered questionnaire.

### **Setting**

The study was conducted at the University Teaching Hospital in the Department of Obstetrics and Gynaecology as well as in selected clinics in Lusaka Urban District which has a population of about 2 million (CSO 2000 census). At UTH, antenatal care (ANC) services are accessed through a clinic that also serves as a referral center for Lusaka. Apart from those referred from the clinics, some women choose to access ANC at UTH. Most of the women seen antenatally at UTH deliver in the UTH labour ward.

There are 24 clinics offering MCH services with 12 being midwifery-led delivery sites. (Four of the twelve clinics conducting deliveries were selected - see sampling below).

### **Target population and sample population**

**Target:** This study was conducted at the University Teaching Hospital Department of Obstetrics and Gynaecology and in the clinics in Lusaka Urban, which offer maternity services. The target of the study was all health care providers in these facilities. The study sample was drawn from the Department of Obstetrics and Gynaecology at UTH and from four clinics in Lusaka Urban District randomly selected from the twelve that are delivery centers. The clinics were Kalingalinga, Matero Reference, George .and Chilenje.

**Sample Size:** The literature reviewed does not show a high level of knowledge of PMTCT, with levels ranging from less than two thirds of healthcare providers with adequate knowledge in a Nigerian study (Nneka and Donna 2007) to about 42 percent who knew the correct PMTCT regime in a study in Guatemala (Ikeda, et al 2004). These populations may not be representative of our Zambian healthcare providers at UTH. Therefore 50 percent was taken as the level of acceptable knowledge to estimate the sample size at a confidence level of 95 percent .The precision of 5 percent was tolerated. The formula:

$$n = [(Z*Z)*P*(1-P)]/D*D$$

where Z reflects the confidence interval, P is the level of knowledge; D is the precision to calculate the sample of an infinite population.

$$n = [(1.96*1.96)*0.5*(1-0.5)]/0.05*0.05$$

$$0.9640/0.0025$$

$$S=384.6$$

Adjusting the sample to a finite population of healthcare providers in the department of Obstetrics and Gynaecology and in the selected clinics of about 180 the sample is

$$S = n / [(1+n/population)]$$

$$S = 384.16 / [1 + (384.6/180)] = 128$$

Adjusted for a non response rate of 10 percent the sample size is 140

**Sampling:** *Stratified random sampling* was used to recruit participants using random numbering. At UTH, there were many more midwives as compared to doctors in the Department of Obstetrics and Gynaecology. Therefore, the numbers to be included in the study were stratified according to the proportion of nurses and doctors. Among the four clinics, some had more healthcare providers as compared to others thus the numbers to

be included from each clinic was worked out in proportion to the population of the health care workers. The healthcare providers to be included in the study were then randomly selected.

***Participant inclusion Criteria:***

1. Doctors working in Department of Obstetrics and Gynaecology at UTH at the time of the study.
2. Doctors working in the four LUDHMT clinics selected for the study.
3. Midwives at UTH currently in the Department of Obstetrics and in LUDHMT clinics selected for this study.
4. Nurses at UTH and LUDHMT working in areas that provide PMTCT services even if they are not midwives.

***Exclusion Criteria***

1. Doctors, midwives and nurses not currently working in the department of Obstetrics and Gynaecology at UTH.
2. Those healthcare providers not at the station at the time of the study.
3. Those healthcare providers who refuse to participate.
4. Foreign trained doctors who had recently joined the department having practiced for less than one year in Zambia.

***Data Collection:*** After obtaining written consent to participate (Appendix I), we used structured questionnaires (Appendix II) with both closed and open-ended questions to collect information from participants regarding KAP to do with PMTCT.

The questionnaire was developed based on a review of the literature regarding KAP and PMTCT. The questions included those that had been validated and used in the Zambia Demographic and Health Survey, the Namibia Demographic and Health Survey, the Zambia PMTCT course manual (CBOH, Zambia 2004).

Prior to administration of the questionnaire, for further validation, it was pre-tested by the author for comprehensibility, appropriateness of the language and average duration of administration on five health providers in the department of Obstetrics and Gynaecology at the UTH who were not included in the study sample. Based on the pilot, changes were made to the questionnaire to improve clarity and flow. The average duration was 45 minutes.

A trained research assistant, a sixth year medical student with knowledge on PMTCT, conducted the interviews. The assistant was trained in how to administer the questionnaire and participated in the pilot testing as well. The interview was conducted in English, as all participants (healthcare workers) were fluent in English. Once collected, the data was checked for completeness. Where the information entered was not clear or appeared incomplete the research assistant clarified the entries, if necessary by checking with the participant. It was noted that participants had the right to decline any particular parts of the questionnaire. The data was then entered into Epi info version 6 and exported for analysis to SPSS version 16.

***Scoring of Knowledge, Attitude and Practice:***

1. Knowledge: knowledge of prevalence, (instrument questions 10 and 11), transmission (13 to 19), interventions and PMTCT guidelines (21 to 25).

Scores were given as a percentage with 85 percent and above as good, 50-84 percent fair and less than 50 percent poor.

2. Attitude: Scoring was done using a “Likert” scale for one question, No 52, which had 5 stems. The responses to eight other selected questions from the attitude section (46-51, 53, 54) of the questionnaire were also used to assess attitude. The Likert scale grading (for question 52) was as follows:

Type of statement	Agree	Somewhat agree	Somewhat Disagree	Disagree
Positive towards PMTCT	3	2	1	0
Negative towards PMTCT	0	1	2	3

3. Practice: We assessed this using 20 questions (numbers 26 to 45) in the instrument. These were used to assess the practice of counseling and testing, labour and delivery. Total score was out of twenty. The grading was as for the knowledge section.

**Analysis:** The Chi square was used to determine association between variables and analysis of variance was used to compare mean scores for continuous variables. Statistical significance was set at 5 percent (i.e. 0.05).

**Role of the author:** The author of this dissertation compiled the study design, obtained the relevant authorizations, pilot tested the instrument, oversaw the research assistant, checked the data, compiled the results and wrote the dissertation. The author reported progress regularly to the supervisor.

**Ethical Consideration:** Prior to carrying out the study, we obtained approval from the University of Zambia Research Ethics Committee. We also obtained permission from the Head of Department of Obstetrics and Gynaecology as well as the Managing Director of UTH. We obtained similar permission from the District Director of the Lusaka Urban District Health Management Team for the study to be conducted in the clinics. All participants provided written consent. None of the questionnaires had any personal identifiers. The filled-in questionnaires were stored in a locked filing cabinet and accessible only to the data entry clerk and author.

## Results

All 140 healthcare providers invited for interview agreed, giving a 100 percent response rate. Ninety six of the 140 providers (68.6%) were from UTH and 44 (31.4%) were from the clinics. Table 3 shows the distribution of demographic characteristics among the providers. There were more females interviewed in the clinics (93.2%) as compared to UTH (77.1%). This is because 90 percent of the healthcare providers interviewed in the clinics were nurses compared to 70 percent at UTH. Doctors represented 3 percent of the study population in the clinics and 30 percent at UTH. There is a difference in age distribution between the clinics and UTH. Most of the healthcare providers in the clinics were above 40 years of age (63.7% compared to 37.5% at UTH). At UTH, most healthcare providers interviewed were between the ages of 21 to 40 years (62.6%). Sixty eight percent of those interviewed in the clinics had worked for more than 10 years whereas amongst UTH respondents only 38.5 percent had worked for longer than 10 years. There were more university graduates UTH compared to the clinics (30.2% vs. 6.8%), reflecting the fact that of the 32 doctors interviewed, 29 were at UTH and 3 in the clinics. The mean length of service for the study population was 12.6 years. There was no difference in marital status of those interviewed between UTH and the clinics.

In summary, compared to those interviewed at UTH, clinic staff were more likely to be female, nurses, older, not educated at University, and had served longer.

**Table 3: Demographic characteristics of healthcare providers**

Characteristics	UTH	Lusaka Urban Clinics	Total	P value
	n=96 (%)	n=44 (%)	N=140 (%)	
<b>Gender</b>				
Male	22 (22.9)	3 (6.8)	25 (17.9)	0.021
Female	74 (77.1)	41 (93.2)	115 (82.1)	
<b>Age (years)</b>				
21-30	18 (18.8)	2 (4.5)	20 (14.3)	0.016
31-40	42 (43.8)	14 (31.8)	56 (40.0)	
41-50	23 (24)	20 (45.5)	43 (30.7)	
>50	13 (13.5)	8 (18.2)	21 (15.0)	
<b>Education</b>				
University	29 (30.2)	3 (6.8)	32 (22.9)	0.002
College	67 (69.8)	41 (93.2)	108 (77.1)	
<b>Profession</b>				
Medical Officer	29 (30.2)	3 (6.8)	32 (22.9)	0.002
Nurse	67 (69.8)	41 (93.2)	108 (77.1)	
<b>Length of Service (Years)</b>				
0-5	39 (40.6)	9 (20.5)	48 (34.3)	0.005
6-10	20 (20.8)	5 (11.4)	25 (17.9)	
>10	37 (38.5)	30 (68.2)	67 (47.9)	
<b>Marital Status</b>				
Married	60 (62.5)	25 (56.8)	85 (60.7)	0.523
Single	36 (37.5)	19 (43.2)	55 (39.3)	

## Knowledge related to PMTCT

Basic knowledge on HIV as it relates to PMTCT was generally poor. Only 10.7 percent of the respondents knew the HIV prevalence in Zambia (Table 4). Eighteen percent got the HIV prevalence for Zambian women correct. Only 8.6 percent knew the risk of vertical transmission of HIV. As regards transmission through breast milk, 19.3 percent gave a correct response. Forty five percent knew of the risk of transmission at delivery. Although 96.4 percent of the respondents were aware of the availability of national guidelines on PMTCT, only 50.7 percent gave a correct regime and only 62.9 percent knew the right time of initiating the drugs.

**Table 4: Knowledge of health care providers on PMTCT**

	Correct response		Incorrect response	
	n	%	n	%
Prevalence of HIV in general population	15	(10.7)	125	(89.3)
Prevalence in Women	25	(17.9)	115	(82.1)
Risk Of Vertical Transmission	12	(8.6)	128	(91.4)
Meaning of acronym PMTCT	131	(93.6)	5	(3.6)
Risk of infection during delivery	64	(45.0)	74	(52.9)
Risk of infection through breastfeeding	24	(19.3)	111	(79.3)
Counseling approach in Zambia	66	(47.1)	74	(52.8)
Awareness about availability of guidelines for PMTCT	133	(96.4)	5	(3.6)
Knowledge of ARV prophylaxis regime	71	(50.7)	69	(49.3)
Knowledge of when to initiate ARV	88	(62.9)	52	(37.1)

### Knowledge related to PMTCT by site

There was no significant difference in knowledge between the healthcare providers in the clinics and UTH except for knowledge of HIV prevalence in the female population (Table 5). However, for knowledge of HIV prevalence, more UTH providers knew the correct response compared to those in the clinics (22.9% vs. 6.8%,  $p=0.021$ ).

**Table 5: PMTCT Knowledge by Site (n at UTH=96; n at clinics =44)**

		UTH		Lusaka Urban Clinics		P value
		n	%	n	%	
HIV Prevalence in general population	Correct	37	38.5	13	29.5	0.32
	Wrong	59	61.5	31	70.5	
HIV Prevalence in Women	Correct	22	22.9	3	6.8	0.021
	Wrong	74	77.1	41	93.2	
Vertical transmission risk	Correct	9	9.4	3	6.8	0.616
	Wrong	87	90.6	41	93.2	
Transmission Risk with breastfeeding	Correct	7	7.3	3	6.8	0.496
	Wrong	89	92.7	41	93.2	
Counseling approach in Zambia	Correct	43	44.8	23	52.3	0.416
	Wrong	53	55.2	21	47.7	
Awareness of guidelines on PMTCT	Correct	94	97.9	43	93.2	0.16
	Wrong	2	2.1	3	6.8	
When to Initiate PMTCT Drugs	Correct	54	65.9	28	34.1	0.410
	Wrong	42	72.0	16	27.6	

### **Knowledge related to information on antenatal card**

Table 6 indicates the responses to the question on the meaning of the abbreviations on the ANC card as they relate to HIV and PMTCT (and as obtained from Q35 of the instrument). Not all 140 respondents answered this question. Of these that did (n=111 [79.3%]), most respondents knew the meaning of the initial ‘NR’ and ‘R’ respectively (78.6% and 77.1%). However, interpretation of other initials was poor as illustrated by the scores below.

**Table 6: Meaning of abbreviations in ANC card  
(as answered by 111 respondents).**

<b>Initials</b>	<b>Correct</b>		<b>Wrong</b>	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
PCA	83	74.8	28	25.2
PCR	83	74.8	28	25.2
TR	85	76.6	26	23.4
TA	85	76.6	26	23.4
R	110	99.1	1	0.90
NR	108	97.3	3	2.7
MGA	48	43.2	63	56.8
IGA	44	39.6	67	60.4
FB	30	27.0	81	73.0
FR	27	24.3	84	75.7

PCA= Pre-counseling accepted; PCR= Pre-counseling refused; TR= Test refused;  
TA= Test accepted; R=Reactive; NR=Nonreactive; MGA= Mother given antiretroviral;  
IGA= Infant given antiretroviral; FB= Breastfeeding option chosen; FR= Formula option  
chosen.

## Total knowledge score

None of the participants in this study had a total knowledge score that was ‘good’ (above 85 percent) – they were either fair (50-84%) or poor (<50%) (Table7). There was an association between age and knowledge levels ( $p<0.001$ ). Younger personnel, doctors, those with a Masters or an MBChB were more likely to have a ‘fair’ compared to ‘poor’ knowledge score. Location (UTH or clinic), marital status and length of service had no effect on the knowledge score.

**Table 7: Total Knowledge Score**

<b>Characteristic</b>	<b>Good (&gt;85%) n (%)</b>	<b>Fair (50-84%) n (%)</b>	<b>Poor (&lt;50%) n (%)</b>	<b>Total n (%)</b>	<b>P value</b>
<b>Location:</b> UTH	0 (0)	74 (77.1)	22 (22.9)	96 (100)	0.081
Clinics	0 (0)	39 (88.6)	5 (13.4)	44 (100)	
<b>Gender:</b> male	0 (0)	23 (92.0)	2 (8.0)	25 (100)	0.091
female	0 (0)	90 (79.6)	25 (21.7)	115 (100)	
<b>Age:</b> 21-30	0 (0)	18 (90.0)	2 (10.0)	20 (100)	0.001
31-40	0 (0)	50 (89.3)	6 (10.7)	56 (100)	
41-50	0 (0)	35 (81.4)	8 (18.6)	43 (100)	
>50	0 (0)	10 (47.6)	11 (52.4)	21 (100)	
<b>Marital Status:</b>					
Married	0 (0)	71 (83.5)	14 (16.5)	85 (100)	0.202
Single	0 (0)	42 (76.4)	13 (23.6)	55 (100)	
<b>Profession:</b> Nurse	0 (0)	83 (76.9)	25 (23.2)	108 (100)	0.024
Doctor	0 (0)	30 (93.8)	2 (6.3)	32 (100)	
<b>Qualification:</b>					
Masters	0 (0)	5 (100.0)	0 (0.0)	5 (100)	0.024
MB ChB	0 (0)	26 (92.8)	2 (7.1)	28 (100)	
Diploma	0 (0)	53 (86.9)	8 (13.1)	61 (100)	
Certificate	0 (0)	29 (63.0)	17 (37.0)	46 (100)	
<b>Length of Service:</b>					
0-5	0 (0)	41 (85.4)	7 (14.6)	48 (100)	0.414
6-10	0 (0)	21 (84.0)	4 (16.0)	25 (100)	
>10	0 (0)	51(76.1)	16 (23.9)	67 (100)	

### Comparison of composite knowledge scores

The mean knowledge score of the 140 participants was 47.1 percent (range 17.5-77.5%).

Comparison by location and other attributes of the respondents revealed that males (there were more doctors that were male), the younger, university educated with a degree education) had a higher mean knowledge score. (Table 8). Mean scores by location and marital status were not statistically different.

**Table 8: Comparison of Composite Knowledge Scores (N=140)**

Characteristic	n	mean	P value
<b>Location</b>			
UTH	96	59.5	0.78
Lusaka Clinics	44	60.0	
<b>Gender</b>			
Male	25	65.8	0.001
Female	115	58.2	
<b>Age</b>			
21-30	20	61.8	0.002
31-40	56	61.5	
41-50	43	59.8	
>50	21	52.2	
<b>Education</b>			
University	32	66.9	<0.001
College	108	57.4	
<b>Qualification</b>			
MMed/MRCOG	5	73.3	<0.001
MBChB	28	65.9	
Diploma	61	59.8	
Certificate	46	54.0	
<b>Profession</b>			
Doctor	32	66.9	<0.001
Nurse	108	57.5	

**Practice:**

Over half the participants at UTH (53.1%) and the majority in clinics (93.1%) recognized the need to avoid artificial rupture of membranes and episiotomies (Table 9).

**Table 9: Current practice of episiotomy and ARM**

Practice	Location				Total		P value
	UTH		Lusaka Clinics				
done	n	%	n	%	N	%	
Usually	9	9.4	0	0	9	6.4	<0.001
Sometimes	36	37.5	3	6.8	39	27.9	
Never/Rarely	51	53.1	41	93.2	92	65.7	
Total	96	100.0	44	100.0	140	100.0	

**Change in obstetric practice:**

Ninety-two percent of the healthcare providers at UTH and 79.5 percent in the clinics reported that they had changed their practice of doing ARM and episiotomies since the introduction of PMTCT (Table 10). There was a significant difference in the practice of episiotomy and ARM between the clinics and UTH. The healthcare providers at UTH reported avoiding ARM and episiotomy more since introduction of PMTCT services (p=0.04).

**Table 10: Change in practice of Episiotomy and ARM with PMTCT**

Practice	Location				Total		P value
	UTH		Lusaka Clinics				
done	n	%	n	%	N	%	
Yes	87	91.6	35	79.5	122	87.8	0.044
No	8	8.4	9	20.5	17.0	12.2	
Total	96	100.0	44	100.0	140	100.0	

### **PMTCT interventions offered**

Considering PMTCT interventions offered by site, proportionally more respondents at the clinics compared to UTH offered counseling on infant feeding, ARV prophylaxis, safer obstetric practices, and VCT (Table 11). There was no statistical difference in offering caesarean section as an option for delivery or PCR to infant.

One hundred and thirty of the 140 providers (92.9%) indicated a need to give prophylactic drugs in pregnancy and labour, although, as previously shown in Table 4, only fifty-one percent knew the correct PMTCT regime. Most providers had good practice on counseling and testing with 125 (89.3%) indicating they offered their clients VCT. Although Caesarean section is not included in the Zambian guidelines as an intervention for PMTCT in the public sector, most (98.6%) providers did offer it to their clients as a delivery option and there was no difference between the clinics and UTH. Follow up of the mother and infant does not seem to be adequate as only 40.7 percent offered PCR to the infant.

**Table 11: PMTCT Intervention Offered by Site (yes responses only are shown, the other response was no)**

<b>Intervention</b>	<b>UTH</b>		<b>Lusaka Urban Clinics</b>		<b>All (UTH and Clinics)</b>		<b>P value*</b>
	<b>n</b>	<b>(%)</b>	<b>n</b>	<b>(%)</b>	<b>n</b>	<b>(%)</b>	
Counseling on infant feeding	77	80.2	44	100.0	121	86.4	0.004
ARV Prophylaxis	86	89.5	44	100.0	130	92.9	0.02
Safer Obstetric Practices	25	26.0	37	84.1	62	44.3	0.001
Caesarean Section as Option for delivery	76	79.2	11	25.0	87	98.6	0.5
PCR to infant	39	40.6	18	40.9	57	40.7	1.0
VCT	82	85.4	43	97.7	125	89.3	0.03

\*Fisher's exact test

## Practice scores

Although the responses on PMTCT interventions offered suggest a good standard of practice the total practice score was generally poor (Table12). There was no statistical difference between ‘fair’ and ‘poor’ scores (there were no good scores) of total practice score when age, gender, education, profession, length of service or location were considered.

**Table 12: Practice Scores**

	<b>Fair</b>		<b>Poor</b>		<b>Total</b>		<b>P value</b>
	n	%	n	%	n	%	
<b>Location</b>							
UTH	26	(27.1)	70	(73.0)	96	(100)	0.981
Lusaka Urban Clinics	12	(27.3)	32	(73.0)	44	(100)	
<b>Sex</b>							
Male	7	(28.0)	18	(72.0)	96	(100)	0.915
female	31	(26.9)	84	(76.4)	44	(100)	
<b>Age</b>							
21-30	7	(35.0)	13	(65.0)	20	(100)	0.5
31-40	15	(26.8)	41	(73.2)	56	(100)	
41-50	9	(21.0)	34	(79.1)	43	(100)	
>50	7	(33.3)	14	(66.7)	21	(100)	
<b>Education</b>							
University	8	(25.0)	24	(75.0)	96	(100)	0.756
College	30	(27.8)	78	(72.2)	44	(100)	
<b>Profession</b>							
Medical Officer	8	(25.0)	24	(75.0)	96	(100)	0.756
Midwife/nurse	30	(28.0)	78	(72.2)	44	(100)	
<b>Length of service(yrs)</b>							
0-5	10	(21.0)	38	(79.2)	48	(100)	0.455
6-10	7	(28.0)	18	(72.0)	25	(100)	
>10	21	(31.3)	46	(68.7)	67	(100)	

## **Attitude**

Attitudes to PMTCT were generally good. The vast majority of providers (91.7%) felt PMTCT was a good service while 9.3 percent felt it was good but needed improvement. (Table 13). Over half (58.6%) felt they were not providing for their clients' needs. This was because they felt the patients are poor and they were not providing for their socio-economic needs. It was generally felt that PMTCT had increased the workload (80%) though acknowledging that it was an important programme (99.3%). Seventy eight percent said they should get extra incentives for providing PMTCT. Other attitudes are outlined in Table 13.

**Table 13: Provider Attitudes to PMTCT**

<b>Attitude towards PMTCT</b>		<b>n</b>	<b>%</b>
What do you think of PMTCT?	Good	127	90.7
	Good but needs improvement	13	9.3
What are the needs of an HIV positive woman	Social and medical care	121	86.4
	Others	19	3.6
Are you able to meet clients needs	Yes	58	41.4
	No	82	58.6
If not explain	Too much work	66	47.1
	Patients poor	34	24.3
What has been impact of providing PMTCT	Increased workload	112	80.0
	No Change	28	20.0
Do you think you should be given incentives for PMTCT provision	Yes	109	77.9
	No	30	21.1
PMTCT Programme very important	Agree	139	99.3
	Disagree	1	0.7
Not enough time to give to PMTCT	Agree	62	44.3
	Somewhat agree	13	9.3
	Somewhat disagree	03	2.1
	Disagree	62	44.3
Providing PMTCT Stops us providing good ANC care	Agree	6	4.3
	Somewhat agree	2	1.4
	Somewhat disagree	5	3.6
	Disagree	127	90.7
Fear getting Infected by working with HIV positive women	Agree	1	0.7
	Somewhat agree	1	0.7
	Somewhat disagree		
	disagree	138	98.6
I am scared to deliver HIV positive women because of fear of infection	Agree	1	0.7
	Somewhat agree	1	0.7
	Somewhat disagree		
	disagree	138	98.6
Why Some women refuse HIV Testing in ANC	Fear of results	96	68.0
	Fear of stigma	106	75.0
	Feel are not at risk	6	4.3
Should an HIV positive woman have children?	Yes	109	77.9
	No	31	22.1
Reason for above answer	Human Right	117	83.6
	Other	23	16.4

## Comparison of attitude scores

There was no statistically significant difference in attitude by age, gender, education, location, or length of service (Table 14).

**Table 14: Attitude Score.**

Characteristic	Good		Poor		Total	P value
	n	%	n	%		
<b>Location:</b> UTH	91	(94.8)	5	(5.2)	96	0.615
Clinics	42	(95.5)	2	(4.5)	44	
<b>Gender:</b> Male	24	(96.0)	1	(4.0)	25	0.636
Female	109	(95.0)	6	(5.2)	115	
<b>Age (Years):</b>						
21-30	19	(95.0)	1	(5.0)	20	0.755
31-40	52	(93.0)	4	(7.1)	56	
41-50	42	(98.0)	1	(2.3)	43	
>50	20	(95.2)	1	(4.8)	21	
<b>Education:</b>						
University	30	(94.0)	2	(6.3)	32	0.504
College	103	(95.4)	5	(4.6)	108	
<b>Profession :</b> Doctor	30	(94.0)	2	(6.3)	32	0.504
Nurse	103	(95.4)	5	(4.6)	108	
<b>Length Of Service (yrs):</b>						
0-5	44	(92.0)	4	(8.3)	48	0.417
6-10	24	(96.0)	1	(4.0)	25	
10	65	(97.0)	2	(3.0)	67	

## Discussion

This study endeavored to assess the knowledge, attitude and practices on PMTCT of health care providers at UTH and selected Lusaka urban district clinics.

The knowledge, attitudes and practices found amongst the participants are presented in tables 4-8. Although they are discussed in detail below, the summary is that knowledge levels among the study population were generally poor. Overall, (as presented in Table 8), mean composite scores were in the 60-70% range. There was no statistically significant difference in mean scores by facility (UTH/clinics), though younger, university trained providers (doctors) had better knowledge. Prevalence was poorly known, and although awareness of existence of guidelines was high, the knowledge of their contents was fair – this cut across sites.

Attitude scores towards PMTCT were high (90 plus percent). Participants were not scared to deliver an HIV-infected women, nor feared acquiring HIV from patients. They felt it did not stop them delivering good antenatal care and overall had a good opinion of PMTCT (Table 13). However, they did express concern that it had increased their workload, that they did not have enough time to provide the service, that they should be given incentives, and overall felt that they were not able to meet clients demands. There was no statistical difference in attitude scores between sites and other participant demographics.

Regarding practices, safer obstetric practice (avoiding episiotomy and ARM unless if clinically indicated) and PCR testing of newborns was not generally performed (Table 11). Otherwise use of ARV prophylaxis, counseling on mode of delivery and infant feeding was in the 80-plus percent range. There was no statistical difference in practice between sites and other participant demographics.

**Knowledge:** Other studies on provider knowledge of HIV in general and on PMTCT in particular have revealed varying results with some studies revealing good knowledge. Harms et al (2005) found that knowledge levels were high among providers studied (83-93%) and varied directly with previous contact with HIV patients. However, other studies on provider knowledge have also shown poor knowledge scores. Hentgen et al (2002) in Madagascar in a study to find out the feasibility of introducing VCT in antenatal clinic found most healthcare workers had poor scientific knowledge. Some of the health care workers believed transmission was possible by just living with somebody who is HIV positive without having sex. In their study, some also believed that transmission was possible by using the toilet after an HIV positive patient and even by blood donation.

Seventy three percent of the health care providers studied by Hentgen et al (2002) also believed that a baby born of an HIV positive woman invariably was infected and they did not know of any interventions to reduce the risk. In our study, although total knowledge score was poor most of the healthcare providers were aware of the right routes of transmission. They were also aware of PMTCT interventions. This study revealed that there was an association between provider knowledge and professional education as well as training in PMTCT (Table 7). Nneka et al (2007) and Hentgen et al (2002) also found doctors were more knowledgeable than paramedics and nurses However, Aisien and Shobowale (2005) found that there was no statistically significant difference in knowledge between different professionals. Previous management of HIV positive patients has been seen to result in better knowledge (Harms et al 2005; Ndikom and Onibokin, 2007). However, Olges et al (2007) also found that though most providers in their study were offering antenatal testing for HIV, they had poor knowledge of the disease as it relates to pregnancy unless they had also managed non-pregnant patients

with HIV. Training of healthcare providers will help improve their knowledge on various aspects of PMTCT, particularly for those providers that have not previously had experience managing patients with HIV.

**Attitudes:** Providers in this study were willing to care for HIV infected mothers and did not consider themselves to be at increased risk of infection. Other studies have shown that most providers are willing to care for HIV infected women as long as they have protective clothing (Ndikom et al 2007). However, we did not investigate the aspect of protective clothing in this study. Seventy eight percent of healthcare providers in our study agreed that HIV positive women should have children and 83.6 percent thought this was a human right. By contrast, Misiri et al (2008) in their study, in which they were assessing the readiness of clinics in Malawi to provide PMTCT, found 81.2 percent of health care providers said HIV positive women should not become pregnant. Thirty seven percent of the providers said they would be uncomfortable to assist in a delivery of an HIV positive woman. The healthcare providers in our study have a relatively good attitude compared to these. Other studies reviewed showed profession or level of education did not affect attitude (Hentgen et al 2002, Aisen and Shobawale 2005). Doctors, nurses and paramedics had same restrictive attitudes. This study too, showed no significant effect of age, gender, length of service or education on attitude (Table 15).

Excessive workload and staff shortages are identified as negatively influencing PMTCT delivery. Healthcare providers felt a need to be rewarded for the extra work involved in PMTCT. This was in spite of an overall positive attitude to PMTCT. The practice scores for all the health workers were fair to poor (Table 13). There was no association with gender, education, or length of service. However Giles et al (2007) in their study on barriers to offering HIV testing in ANC found younger obstetricians and females were

offering the test more often to their clients. The practice score in our study probably reflects the positive attitude of most of the healthcare providers. However, since they had poor knowledge their practice of PMTCT may not be of good standard with a possibility of them disseminating wrong information and inadequate counseling. Eighty-nine percent reported that they were offering counseling and testing to their clients. The healthcare providers compare well with other studies. Hentgen et al (2002) found that 61 percent never advised their clients on testing for HIV. Only 10 percent took correct precautions when counseling.

Tan et al (1998) in Singapore found only 43.9 percent offering the HIV test in antenatal women. In their study both pre and post counseling was poor with only 17.9 percent offering pre test counseling and 19 percent offering post test counseling. Olges et al (2007) found most of the providers reporting that they were offering the test but there was poor follow up if the client declined the test. Chambers et al (2001) in New Zealand found that most providers had a good attitude to HIV testing in antenatal. However, most of the providers interviewed had done less than three tests in the preceding 12 months. They cited reluctance of women to be tested, lack of time, skills, knowledge and support services as influencing their testing practices. This seems to be true in our study as well. Health care providers feel the workload is excessive and they are unable to meet their clients' needs.

**Practice:** In this study although most of the providers reported offering the appropriate interventions for PMTCT, when asked if they were offering safer obstetric practices only 44.3 percent said they were. This is possibly because they were looking at the environment and non-availability of resources such as disinfectants. This is further evidenced by the response on episiotomy and artificial rupture of membranes. Most of

the providers (65.7%) avoided these and said their practice had changed (87.1%) since advent of PMTCT. There was no specific question addressing availability of resources in our questionnaire. Follow up of the mother and infant seems to be poor as evidenced by the fact that only 40.7 percent said that they offered PCR to the infant.

Qualitative data was not analysed in this study although the instrument enabled qualitative information to be provided. This could have been done by assigning themes to some responses as well as focus group discussions and then using NVivo statistical package. However, the crude data was used to inform the discussion.

## **Strengths and Weaknesses of the Study**

### ***Strengths:***

This was an anonymous survey thus people were more willing to participate and give even wrong answers without feeling intimidated. Multiple facets were explored as the questionnaire had both open ended and closed ended questions. Due to the high response rate (100%) in this study the risk of selection bias was minimized.

### ***Weaknesses:***

Only one interviewer was used. Some responses recorded, especially for the closed-ended questions may not have brought out the actual intended meaning of the interviewee, as it was difficult to probe. Probably focus group discussions would have improved in assessing the attitudes.

Questions may have different meanings for different people and therefore the information obtained may not be so accurate.

It is also difficult to tell how honest the responses were. Respondants may have reported wrongly either intentionally or unintentionally. This may have introduced subject bias in the results resulting in a false results particularly as they relate to attitude and practice.

As is typical of a cross sectional study, only the association of the results obtained regarding the KAP on PMTCT among the providers with various factors can be established. Further detailed reasons for the causes of the KAP could not be established through this type of study.

## **Conclusions**

Knowledge, attitudes, and practice on PMTCT amongst health care providers at UTH and in Lusaka urban clinics show that there was poor knowledge and practice although the attitude was acceptable. Without further training and increase in staffing levels, the quality and access to PMTCT services will likely be negatively impacted.

## **Recommendations**

The following recommendations are made based on the study:

1. There is need for pre-service and continuous medical education on PMTCT. All new midwives and new medical officers should undergo PMTCT training and those who are in service should have refresher courses on current guidelines.
2. Incentives should be given to healthcare providers for the extra work involved in PMTCT as most of the healthcare providers indicated that providing PMTCT increased their workload and they felt they needed to be paid for the extra work involved .This would motivate them to provide a better service.
3. There is need to train more health workers to reduce the workload which was identified as a constraint to the PMTCT service delivery.

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## Appendix I

### Information sheet and consent form

**Introduction:**

Good morning /afternoon. My name is..... I am a research assistant. I am assisting in carrying out a study on knowledge, attitudes, and practices of healthcare providers towards PMTCT at UTH and LUDHMT. Dr Theresa Nkole is carrying out this study. She is a postgraduate student in the department of Obstetrics and Gynaecology. The study is being carried out as a partial fulfillment for the degree of Masters of Medicine in Obstetrics and Gynaecology.

**Purpose of the Study:** The information obtained will be used to help improve PMTCT delivery at UTH and in LUDHMT clinics. It will also identify training needs for PMTCT among our healthcare providers. As already mentioned the study is also being done as a requirement in partial fulfillment for the degree of Master of Medicine in Obstetrics and Gynaecology.

**Voluntary Participation:** Your participation in the study is voluntary. You will not be paid to participate in the study. The information you give is confidential .The questionnaires will not have your name but will have numbers, which will not be identified to you. You are free to withdraw from the interview at any given time should you not wish to continue.

**Problems/questions:** If you have any questions regarding the study, please contact Dr. Theresa Nkole on cell 0977990225. Any queries regarding ethics should be addressed to the Chair of the research Ethics committee of the University of Zambia, Ridgeway Campus, P O. Box 50110 Lusaka, Zambia. Phone +260 211 252641. Email: unzarec@zamtel.zm.

If you agree to take part in the study, you can sign the consent form. The questionnaire will take about 45 minutes.

**ASSESSMENT OF KNOWLEDGE ATTITUDE AND PRACTICES ON PMTCT  
AMONG HEALTHCARE PROVIDERS AT UTH AND LUDHMT**

**CONSENT FORM**

I agree to take part in the study on attitudes knowledge and practices of healthcare providers to PMTCT. I understand that participation in the study is voluntary.

Name:

Signature:

Date:

Witness:

Signature:

Date:

## Appendix II

### QUESTIONNAIRE

#### BACKGROUND CHARACTERISTICS

No.	QUESTION	RESPONSE
Q1.	Circle sex of Respondent	(a) Male [ ] (b) Female [ ]
Q2.	How old were you at your last birthday?	Age in completed years ...
Q3.	What is the highest level of education you have attained?	(a) University [ ] (b) College [ ] (c) High School [ ] (d) Other specify [ ]
Q4.	What is highest professional qualification you have attained?	(a) Doctorate [ ] (b) Masters [ ] (c) Degree [ ] (d) Diploma [ ] (e) Certificate [ ]
Q5.	What is your occupation/profession?	(a) Doctor [ ] JRMO [ ] SRMO [ ] Registrar [ ] Senior Registrar [ ] Consultant [ ] (b) Midwife [ ] E Midwife [ ] R Midwife [ ] (c) Nurse [ ] E Nurse [ ] R Nurse [ ] (d) Clinical Officer [ ]
Q6.	Which ward do you work in?	(a) ANC/ Family Planning [ ] (b) Labour Ward [ ] (c) Antenatal /Postnatal Ward [ ] (d) Gynaecology Ward [ ]
Q7.	How long have you been working in your current job?	..... years
Q8.	What is your religion? Specify.	
Q9.	What is your marital status?	(a) Married [ ] (b) Widowed [ ] (c) Divorced [ ] (d) Separated [ ] (e) Single [ ]

## KNOWLEDGE

No.	QUESTIONS	RESPONSE
Q10.	What is the current HIV prevalence amongst the population in Zambia?  [ANSWER AS %]	
Q11.	What is the HIV prevalence rate in women?  [ANSWER AS %]	
Q12.	Please tell me what the letters PMTCT stand for.	
Q13.	In your opinion, how can a newborn child be infected with HIV?  [TICK ACCORDING TO RESPONSE, DON'T PROBE TICK ALL THAT APPLY]	(a) From mother during pregnancy [ ] (b) Through breastfeeding [ ] (c) During delivery [ ] (d) From being injected with contaminated needles [ ] (e) Other specify [ ]
Q14.	When do you think a newborn baby can get HIV from the mother?	(a) During pregnancy [ ] (b) At delivery [ ] (c) Through breastfeeding [ ] (d) Other specify [ ]
Q15.	What is the chance of an HIV positive woman transmitting HIV during pregnancy to her unborn child in absence of intervention?  [ANSWER AS %]	
Q16.	What can a mother do to reduce the risk of transmission of HIV to her unborn child?  [DO NOT READ RESPONSE PROBE WITH ANYTHING ELSE. CIRCLE ALL THAT APPLY]	(a) Take ARV Prophylaxis [ ] (b) Use condom [ ] (c) Abstain from sex [ ] (d) Eat better [ ] (e) Seek ANC [ ] (f) Nothing [ ] (g) Other specify [ ]
Q17.	Should a mother who is HIV positive breastfeed?	Yes [ ]                      No [ ]

Q18.	What is the risk of an HIV positive woman who is not on ART transmitting HIV through breastfeeding?  [ANSWER AS %]	
Q19.	What are the factors that increase the risk of a woman transmitting HIV through breastfeeding?  [DO NOT READ RESPONSE PROBE BY SAYING ANYTHING ELSE. TICK RESPONSE]	(a) Recent infection of HIV [ ] (b) Security of HIV infection [ ] (c) Obstetric procedures [ ] (d) Duration of breastfeeding [ ] (e) Exclusive breastfeeding [ ] (f) Mixed feeding [ ] (g) Conditioning of breast [ ] (h) Other (Specify) [ ]
Q20.	What are the risks for the baby of not breastfeeding?	(a) Will not grow well [ ] (b) No risks [ ] (c) Child will be malnourished [ ] (d) Child may get HIV [ ] (e) Child will suffer illness more often [ ] (f) Other specify [ ] (g) Don't know [ ]
Q21.	What counseling approach is used in Zambia for PMTCT?  [TICK APPROPRIATE RESPONSE]	(a) Opt in [ ] (b) Opt out [ ] (c) Don't know [ ]
Q22.	Explain the 'Opt out' approach.  [WRITE WHAT RESPONDENT SAYS]	
Q23.	As far as you know, are there National guidelines on PMTCT?	Yes [ ] No [ ]
Q24.	When is ARV prophylaxis provided to the mother?  [TICK RESPONSE, DO NOT PROBE]	(a) At maternity during labour [ ] (b) At 36 weeks [ ] (c) At 28 weeks [ ] (d) Before 28 weeks [ ] (e) At first visit [ ] (f) Other (Specify) .....
Q25.	According to the current guidelines, which ARVs are recommended for PMTCT?  [DO NOT READ ANSWERS, TICK RESPONSE]	(a) NVP only (b) AZT and NVP (c) NVP, combination (d) 3TC only (e) AZT only

## PRACTICE

NO.	QUESTION	RESPONSE	
Q26.	Which of the following PMTCT services do you offer? (PROBE)  VCT  Ongoing Counseling  Infant feeding  Counseling  ARV Prophylaxis  Infant formula  PCR for infant  Safer obstetric practices  C/section as option for delivery	Yes [ ] No [ ]  Yes [ ] No [ ]	<b>If no, do you refer?</b>  Yes [ ] No [ ]  Yes [ ] No [ ]
Q27.	In the past six months, how many pregnant women have you counseled during ANC?		
Q28.	Who provides VCT for PMTCT in this facility?		
Q29.	Is there a designated area for VCT for PMTCT in this facility?	Yes [ ] No [ ]	
Q30.	Have you been trained in HIV testing?	Yes [ ] No [ ]	
Q31.	How many tests have you performed and read on your own since training?		

Q32.	Where does HIV testing for PMTCT take place in this site?  [READ OUT RESPONSES]	(a) All testing confirmation on site ANC/MCH [ ] (b) Preliminary done on site confirmation sent to other laboratories. [ ] (c) Blood drawn at ANC/MCH testing carried out in other laboratories. [ ] (d) At a designated VCT unit. [ ]
Q33.	When do women receive their results?	(a) Same day [ ] (b) Within a few days [ ] (c) At their next scheduled visit [ ] (d) Other (Specify) [ ]
Q34.	What is the time interval?	(a) Minutes [ ] (b) Hours [ ] (c) Days [ ] (d) Weeks [ ] (e) Don't know [ ]
Q35.	The ANC card has a stamp. Can you explain/tell me what the letters on the stamp mean?	<p style="text-align: center;"><b>Correctly identified</b></p> PCA      yes [ ]    no [ ] PCR      yes [ ]    no [ ] TR        yes [ ]    no [ ] TA        yes [ ]    no [ ] R         yes [ ]    no [ ] NR        yes [ ]    no [ ] MGA      yes [ ]    no [ ] IGA      yes [ ]    no [ ] FB        yes [ ]    no [ ] FR        yes [ ]    no [ ]

Q36.	Do you offer infant feeding counseling?	Yes [ ]      No [ ]
Q37.	What HIV feeding options do you offer for HIV positive women?  [PROBE DON'T READ RESPONSES]	(a) Exclusive breastfeeding with early cessation [ ] (b) Wet nursing [ ] (c) Formula [ ] (d) Multi banks [ ] (e) Expressed heat treated milk [ ] (f) Home prepared formula made from modified animal milk [ ] (g) Other (Specify).....
Q38.	What method do the women counseled mostly choose?	(a) Exclusive breastfeeding with abrupt cessation [ ] (b) Formula feeding [ ] (c) Other specify [ ]

Q39.	<p>What specific methods of family planning do you offer to HIV positive women?</p> <p>[TICK RESPONSE, DO NOT PROBE]</p>	<p>(a) Natural [ ]</p> <p>(b) Breastfeeding counseling [ ]</p> <p>(c) Condoms [ ]</p> <p>(d) The pill (COP) [ ]</p> <p>(e) IUCD [ ]</p> <p>(f) Injectable [ ]</p> <p>(g) Norplant [ ]</p> <p>(h) Spermicide [ ]</p> <p>(i) Female sterilization [ ]</p>
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### LABOUR AND DELIVERY

Q40.	<p>How do you normally manage HIV positive women in labour?</p> <p>[RECORD RESPONSE AS GIVEN]</p>	
Q41.	<p>How often do you do ARMS, epistomies?</p>	<p>(a) Always [ ]</p> <p>(b) Usually [ ]</p> <p>(c) Sometimes [ ]</p> <p>(d) Never/rarely [ ]</p>
Q42.	<p>Under which circumstances?</p>	
Q43.	<p>Has this changed since the introduction of PMTCT?</p>	<p>Yes [ ]                      No [ ]</p>
Q44.	<p>How? Explain ...</p>	
Q45.	<p>Ideally, what would like to have to carry out vaginal exams on women in labour?</p> <p>[DO NOT READ ANSWER PROBE WITH ANYTHING ELSE]</p>	

## ATTITUDE

Q46.	What do you think of PMTCT?	
Q47.	In your opinion what are the needs of an HIV positive woman?	
Q48.	Do you feel you are able to meet your clients' needs?	
Q49.	If not explain?	
Q50.	What has been the impact of providing PMTCT on your workload?	
Q51.	Do you think you should be provided incentives for providing PMTCT?	
Q52.	<p>Please indicate how you feel about each of the following statements.</p> <ol style="list-style-type: none"> <li>1. The PMTCT programme is very important in this women's clinic.</li> <li>2. There isn't enough time to give to the PMTCT programme.</li> <li>3. Providing PMTCT stops us from providing good ANC.</li> <li>4. I do not like working with HIV positive women because of fear of being infected from them.</li> <li>5. I am scared to deliver HIV positive women because of fear of infection.</li> </ol>	<ol style="list-style-type: none"> <li>a) Agree [ ]</li> <li>b) Somewhat agree [ ]</li> <li>c) Somewhat disagree [ ]</li> <li>d) Disagree [ ]</li> </ol> <ol style="list-style-type: none"> <li>a) Agree [ ]</li> <li>b) Somewhat agree [ ]</li> <li>c) Somewhat disagree [ ]</li> <li>d) Disagree [ ]</li> </ol> <ol style="list-style-type: none"> <li>a) Agree [ ]</li> <li>b) Somewhat agree [ ]</li> <li>c) Somewhat disagree [ ]</li> <li>d) Disagree [ ]</li> </ol> <ol style="list-style-type: none"> <li>a) Agree [ ]</li> <li>b) Somewhat agree [ ]</li> <li>c) Somewhat disagree [ ]</li> <li>d) Disagree [ ]</li> </ol> <ol style="list-style-type: none"> <li>a) Agree [ ]</li> <li>b) Somewhat agree [ ]</li> <li>c) Somewhat disagree [ ]</li> <li>d) Disagree [ ]</li> </ol>

Q53.	Why do you think some women in ANC refuse to be tested for HIV?	(a) Fear of results [ ] (b) Fear of stigma [ ] (c) Feel they aren't at risk [ ]
Q54.	In your opinion, should a woman who is HIV positive have children?	(a) Definitely no [ ] (b) Maybe not [ ] (c) Not sure [ ] (d) Maybe yes [ ] (e) Definitely yes [ ]
Q55.	What is your reason for saying so?	
Q56.	<p>Have you received training in the following areas?</p> <ol style="list-style-type: none"> <li>1. Antenatal care</li> <li>2. Child survival/IMCI</li> <li>3. Basic counseling</li> <li>4. VCT for PMTCT</li> <li>5. HIV testing</li> <li>6. Provision of ARV for PMTCT</li> <li>7. Nutrition counseling</li> <li>8. Infant feeding counseling and support of HIV positive women</li> <li>9. Optimal obstetric practices</li> <li>10. Training in FP service provision</li> </ol>	<p>Yes [ ]                      No [ ]</p>

**THANK YOU FOR PARTICIPATING.**