

**An investigation of the knowledge and skills of health care providers on early infant  
diagnosis of HIV in Mzuzu, Malawi**

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A mini-thesis submitted in partial fulfilment of the requirements for the degree of Master's in Nursing, Advanced Midwifery and Neonatology at the School of Nursing, University of the Western Cape.



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## ABSTRACT

Early infant diagnosis (EID) programmes offer diagnosis of HIV, which facilitates provision of life-saving care to infants infected with HIV. Implementing programmes for EID and treatment has proved challenging in Malawi. Many infants access EID late or not at all. Previous studies have shown that lack of knowledge among health care providers (HCPs) is a challenge to effective EID. Little is known on the knowledge and skills of health care providers in Malawi.

**Aim:** The aim of the study was to investigate the knowledge and skills of HCPs on EID of HIV in Mzuzu, Malawi. **Objectives:** (i) to examine the knowledge of HCPs on EID of HIV; and (ii) to determine the skills of HCPs on EID of HIV. **Methods:** A descriptive cross-sectional survey design with a quantitative approach was used. The study was conducted in three hospitals in Mzuzu, Malawi. The population was HCPs (doctors, nurses/midwives, clinical officers and medical assistants) working in maternity, paediatric wards and under-five clinics. A total of 68 HCPs participated in the study. A closed-ended self-administered questionnaire was used to collect data. Data were analysed using the Statistical Package for Social Science version 23. Descriptive statistics were used to present the frequency tables of observations. Ethical approval was sought from the University of the Western Cape Senate Research Committee and Malawi National Health Research Council. **Results:** The results on the knowledge of HCPs demonstrate that 38% of them had a score of <69% (poor), 25% scored within 70–79% (fair), and 37% scored >80% (good). Results on the skills showed that 69% of the HCPs scored <69% (poor), 15% scored within 70–79% (fair), and 16% scored >80% (good). The results also showed a correlation between the knowledge of HCPs and their level of education achievement (certificate, diploma and degree) as well as the skills of HCPs and their department of work. **Conclusion:** The study found that more than one-third of the HCPs lacked knowledge and skills

on EID of HIV. These findings reflect the need to address the practical challenges of EID service delivery. **Recommendations:** There is a need to increase the efforts that are being put in place to train HCPs on EID of HIV in order to scale up EID. Training should assess the needs of HCPs regarding the knowledge and skills required in the delivery of EID services.

**KEYWORDS:** Early infant diagnosis, Health care providers, HIV, Knowledge, Skills, PMTCT



## DECLARATION

I declare that ‘An investigation on the knowledge and skills of health care providers on early infant diagnosis of HIV in Mzuzu, Malawi’ is my own piece of work, that it has not been submitted before for any degree or examination in any university or college, and that all the sources I have quoted or used have been indicated and acknowledged as complete references.

Full name..... Date.....

Signature.....





## **DEDICATION**

I would like to dedicate this thesis to my husband Hope, who has constantly encouraged me, and my son Malango for his love, patience and support, and to my family for their prayers and motivation.



## ACKNOWLEDGEMENTS

I would like to thank Almighty God for all the blessings bestowed upon me this far. I would also like to thank my supervisor, Dr Million Bimerew, for his support and guidance throughout this process. I also extend my sincere gratitude to Ndoliwe Kayuni Chihana for assisting me with statistical analyses.

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## ABBREVIATIONS

3TC	Lamivudine
ART	Antiretroviral therapy
ARV	Antiretroviral
AZT	Zidovudine
CDC	Centers for Disease Control
DBS	Dried blood spot testing
DNA	Deoxyribonucleic acid
EID	Early infant diagnosis
HCP	Health care provider
HIV	Human immunodeficiency virus
IMCI	Integrated management of childhood illnesses
MoH	Ministry of Health
MTCT	Mother-to-child transmission
NVP	Nevirapine
PMTCT	Prevention of mother-to-child transmission
PCR	Polymerase chain reaction
PSHD	Presumed severe HIV disease
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
WHO	World Health Organization



## **CHAPTER ONE: INTRODUCTION**

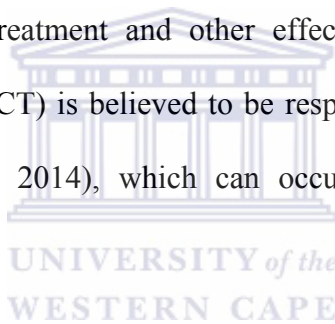
Chapter one presents an overall picture of the study. It provides the background to the study, problem statement, aim of the study, research objectives, significance of the study, and operational definition of terms. This is followed by the conclusion to the chapter.

### **1.1 Background**

Infection with human immunodeficiency virus (HIV) is one of the most damaging diseases mankind has ever met with (Abbas, Lichtman & Pillai, 2012). It is the leading cause of death worldwide. Almost 40 million people worldwide were living with HIV in 2013; 95% of these people were in the developing countries, and 60% of all people living with HIV were in sub-Saharan Africa (Joint United Nations Programme on HIV and AIDS [UNAIDS], 2014). According to World Health Organization [WHO] (2015), more than 78 million people have been infected with HIV globally of these approximately 36.9 million people have died of AIDS-related illnesses since the beginning of the epidemic, and 1.2 million people died of HIV-related illnesses in 2014. The WHO estimates that 2 million new HIV infections occurred in 2014 (WHO, 2015). More than half of all people living with HIV are women, 58% of them in sub-Saharan Africa (UNAIDS, 2012). It is estimated that 3.2 million children (9.1% of the total number of people living with HIV) were living with HIV in 2013, of whom 2.9 million live in sub-Saharan Africa (WHO, 2014a). Approximately 220 000 children were newly infected in 2014 (UNAIDS, 2014) whilst approximately 230 000 children died from AIDS-related illnesses in 2011 (UNAIDS, 2012).

Malawi, a sub-Saharan African country with over 14 million people, is one of the countries with the highest HIV prevalence in the world, and accounts for 4% of all people living with HIV in sub-Saharan Africa (UNAIDS, 2014). UNAIDS (2014), further states that an estimated 1.1 million Malawians were living with HIV and 33 000 died from HIV-related illnesses in 2014, and that 83% of eligible adults and children were receiving antiretroviral therapy (ART).

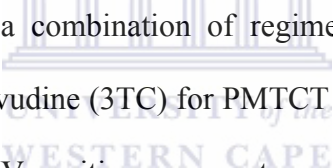
Globally an estimated 1.4 million women living with HIV become pregnant every year (UNAIDS, 2014). UNAIDS states that the risk of women transmitting the virus to their children during pregnancy, labour, delivery or breastfeeding is 15-45% if untreated, whereas the risk can be reduced to below 5% with treatment and other effective interventions (WHO, 2014a). Mother-to-child transmission (MTCT) is believed to be responsible for more than 90% of HIV infections in children (UNAIDS, 2014), which can occur through pregnancy, delivery or postpartum via breastfeeding.



Prevention of mother to child transmission (PMTCT) is an intervention to ensure that no child is born with HIV and is an important step to ensuring an AIDS-free generation. The PMTCT initiative provides drugs, counselling and psychological support to help mothers safeguard their infants against the virus. Globally 73% of women living with HIV received antiretroviral medicine to prevent transmission of HIV to their children in 2014 (UNAIDS, 2015).

PMTCT is one of the key pillars of the HIV/AIDS response in Malawi, Ministry of Health (MoH, 2012).

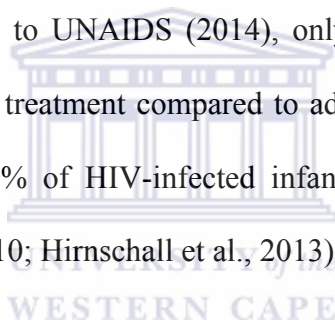
In Malawi the PMTCT programme started with the use of a single-dose nevirapine as a pilot in 2001, and was officially launched nationally in 2003 with the goal of reducing paediatric HIV infection and improving survival and quality of life of exposed infants and HIV-infected children and parents (MOH, 2012). Single-dose nevirapine was used from 2001 until 2008 when Malawi introduced zidovudine (AZT) combination prophylaxis with AZT/3TC (WHO, 2014b). In December 2009 the WHO recommended the use of two options: option A – treatment dependent on CD4 count and option B – treatment initiation for all HIV-positive pregnant women, regardless of CD4 count; to stop treatment when the CD4 count is more than 350 cells/mm<sup>3</sup> after delivery for babies on formula feeds and after cessation of breastfeeding for those on breast milk) (WHO, 2014b).



According to the WHO (2014b) a combination of regimen (Azidothymidine or zidovudine (AZT), nevirapine (NVP) and lamivudine (3TC) for PMTCT was offered at all the PMTCT sites by 2010 in Malawi, and all HIV-positive pregnant women were placed on triple ART (AZT/3TC/NVP; AZT/3TC/LPVr (lopinavir); and AZT/3TC/ABC (abacavir) in response to the 2010 WHO recommendations for PMTCT. In 2011 Malawi recognised that neither option A nor option B best served the national interest of treating as many women as possible to reduce MTCT of HIV (WHO, 2014b). Then Malawi introduced option B+, which enrolls all HIV-positive pregnant or breastfeeding women onto lifelong ART, regardless of CD4 cell count and clinical stage (WHO, 2014b). Consequently the introduction of option B+ in Malawi has resulted in an increase in availability, accessibility and utilisation of PMTCT services. According to a UNAIDS report of 2014, the mother-to-child HIV transmission rate in Malawi was reduced from 36% in 2009 to 13% in 2013 (UNAIDS 2014).

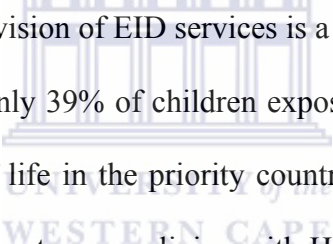
In 2014, 72% of HIV-positive pregnant women in Malawi received ART to reduce MTCT on the road to achieve the 2015 global target of a 90% reduction in the number of children newly infected with HIV, as well as to reduce the number of HIV-associated deaths in women during pregnancy, childbirth or the puerperium by 50% (UNAIDS, 2015).

The Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive was launched in 2011 by UNAIDS, the WHO and other partners (UNAIDS, 2011). This has inspired political leadership, innovation and engagement of communities to ensure that children remain free from HIV and that their mothers stay alive and well (UNAIDS, 2011). According to UNAIDS (2014), only one-third of children living with HIV globally are likely to receive treatment compared to adults. However, studies have shown that without any interventions 50% of HIV-infected infants will die by the age of 2 years (Nuwagaba-Biribonwoba et al., 2010; Hirschall et al., 2013).



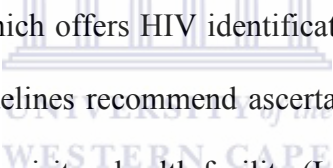
Early infant diagnosis (EID) of HIV programmes which offer diagnosis of HIV infection from 4 to 6 weeks of age facilitates provision of life-saving care to infants infected with HIV, and enables access to HIV prevention, information and support for those testing negative. Early infant HIV diagnosis has become a public health priority in many African countries. In 2010 the WHO issued revised recommendations on the diagnosis of HIV infection in infants and children in response to data showing survival benefits of early ART initiation (WHO, 2013).

Some of the elements included: HIV virological testing, used to diagnose HIV infection in infants and children below 18 months of age; ART initiation in all infants with an initial positive virological test, without delay, but a second specimen for confirmation to be collected; screening to be done in infants with signs and symptoms suggestive of HIV infection with a serological test, and if positive a virological test should follow to confirm infection (WHO, 2013). An effective EID service has to identify all HIV-exposed and infected infants and their mothers, provide the appropriate care in a timely manner; and retain HIV-exposed infants and their mothers throughout the EID cascade until a definitive diagnosis is made, without being lost to follow up (Violari et al., 2008).



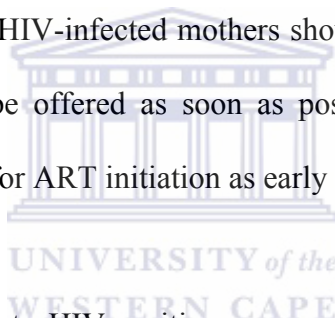
According to UNAIDS (2015), provision of EID services is a challenge, and there are poor infant diagnosis rates globally. In 2013 only 39% of children exposed to HIV received the virological test within the first two months of life in the priority countries globally (22 countries with the highest estimated numbers of pregnant women living with HIV, of which 21 are in sub-Saharan Africa, which are prioritized by the global plan towards the elimination of new HIV infections among children by 2015 at the United Nations general assembly high level meeting on AIDS) for the Global Plan, despite significant investments (UNAIDS, 2015). According to Ndongki et al. (2013) investment in training and support for health care providers (HCPs), improvement of laboratory tools and referral networks are requirements on EID. Oga et al. (2011) state that the feasibility of the EID strategy is reliant upon the availability of platforms and virological tools for EID; the skills, attitudes and practices of health workers toward EID; and acceptability to the affected family.

Implementation guidelines for EID have been developed globally by organisations such as the Centers for Disease Control and Prevention (CDC) and the WHO (Vandenberg, Scanlon, Bacon, Lin & Bress, 2012; WHO, 2010a) and nationally by different countries, for instance Malawi Ministry of Health (MoH, 2014) and South Africa National Department of Health (DOH, 2013). In most countries such as Kenya, South Africa and Malawi, HCPs' training on infant diagnosis of HIV, follow-up care for HIV-exposed infants, information and counselling for parents and caregivers, and the dried blood spot (DBS) test has been conducted (Cherutich, Inwani, Nduati & Mbori-Ngachad, 2008; MoH, 2012; Woldesenbet, Goga & Jackson, 2012). The WHO recommends that training for health workers be conducted through a detailed plan and budget based on realistic objectives (WHO, 2011).



In Malawi the EID programme, which offers HIV identification for all children at six weeks of age, started in 2007. National guidelines recommend ascertainment of HIV exposure status for any child younger than 2 years who visits a health facility (Leach-Lemens, 2012). EID is crucial as it facilitates early initiation of treatment, which significantly reduces AIDS-related mortality in HIV-infected infants (UNAIDS, 2013). To address the HIV and AIDS challenge and deal with maternal and child health within the context of the epidemic, the Malawi Government has put in place a comprehensive framework of national policies, plans and guidelines (UNAIDS, 2014). This framework aims at eliminating new HIV infections among children and keeping their mothers alive. It is based on a four-pronged strategy and is a central commitment of Malawi's Government as part of its efforts to achieve Millennium Development Goals 4 (reduce child mortality), 5 (improve maternal health) and 6 (combat major diseases) (MoH, 2012).

EID programmes have to identify all HIV-exposed infants at the youngest age possible, prior to HIV infection, so infants can benefit maximally from early access to HIV polymerase chain reaction (PCR) testing, maternal or infant prevention of mother-to-child prevention (PMTCT) interventions, breastfeeding counselling, and cotrimoxazole prophylaxis (Braun et al., 2011). The EID practice in Malawi follows the guidelines developed by the Malawi Government to standardise clinical management of HIV-positive patients and HIV-exposed children using an integrated approach (MoH, 2014). The guidelines state that all children under 24 months of age should be actively screened for HIV exposure, mainly sick children seen at under-5 clinics, outpatient departments, nutritional rehabilitation units and in the paediatric wards. All children born to and/or breastfeeding from HIV-infected mothers should be enrolled as soon as possible, and one DNA PCR test should be offered as soon as possible from age 6 weeks to detect perinatal HIV infection and allow for ART initiation as early as possible (MoH, 2014).



In 2014 only 37% of infants born to HIV-positive women received a virological test for HIV within 2 months of birth in Malawi (UNAIDS, 2015), despite improvement of turnaround time to 14 days from the previous 40-50 days (WHO, 2014b), and only 24% of children were on ART in 2013 (UNAIDS, 2014). The EID practice in Malawi is faced by many challenges, as stated by the MoH (2012), such as poor identification of HIV-exposed children which can result from limited knowledge and skills, low access and uptake of HIV testing for children (DNA PCR and rapid test), loss to follow-up of mothers and infants due to long turnaround times to deliver HIV results, and weak linkages between paediatric HIV care and other services, and stigma and discrimination at community level that prevents mothers and caregivers from bringing their children for testing and treatment.

Strategies to deal with these challenges have been put in place by the Government of Malawi (MoH, 2012). Some of these strategies include: capacity building of health workers and laboratory staff to provide paediatric HIV and EID services in all public health care settings; provision of laboratory equipment; the use of a laboratory management information system and rapid SMS technology to reduce turnaround times for delivery of HIV test results; and strengthening the follow-up of mothers and children (MOH, 2012). The Malawi Government has also managed to overcome a shortage of test kits (UNAIDS, 2014) as well as training most of the staff needed for EID scale-up in either ART, PMTCT or both (MoH, 2012).

Despite the achievements of the interventions leading to the scale-up of PMTCT and EID services, accurate diagnosis of HIV in infants and children in Malawi remains a major challenge (MoH, 2012). Furthermore, not all mothers access the services totally, and hence some infants become infected (UNAIDS, 2014). Accurate and early diagnosis of HIV is an important first step in caring for HIV-infected and exposed infants (Sherman, 2006). HCPs are often influential figures in society, and the messages, counselling and advice they provide play a crucial role in ensuring effective EID care (Coulter, Parsons & Ashkham, 2008). On the other hand, the practice of HCPs may affect EID care in other ways; for instance, if the HCP does not know how to diagnose HIV in infants, the infants may end up not being identified, which is a threat to their health. Identification of HIV-exposed infants requires knowledge on EID and skills in blood sample collection. According to Woldeesenbet, Goga, Jackson and the SA EID study group (2012), the intended outcome of EID is not only to identify HIV-exposed infants but to improve their quality of life by providing appropriate infant feeding advice, ARV treatment/prophylaxis and repeat HIV tests during follow-up visits.



This requires health care workers to be knowledgeable and skilled in diagnosing, testing and counselling. Little is known on the knowledge and skills of HCPs on EID of HIV in Mzuzu, Malawi.

### **1.1.1 Summary of background**

EID programmes should identify all HIV-exposed infants at the youngest age possible, prior to HIV infection, so that infants can gain maximum benefit from early access to HIV PCR testing, maternal or infant PMTCT interventions, breastfeeding counselling, and cotrimoxazole prophylaxis. Even though some of the challenges (such as turnaround time) have seen improvements, only 37% of infants born to HIV-positive women received a virological test for HIV within 2 months of birth in 2014 (UNAIDS, 2014). HCPs being the persons that identify the exposed and infected infants as well as being information providers to mothers, need to be knowledgeable and skilled in order to be able to identify, counsel and give the right information to the women.

### **1.2 Problem statement**

Implementation of EID and PMTCT interventions is a challenge in Africa (Kellerman & Essajee, 2010). A national ART scale-up initiated in 2004 improved adult HIV treatment coverage in Malawi; however, paediatric HIV care has lagged (Braun et al., 2011). According to the recommendations of the WHO, HIV-exposed infants need to undergo a virological HIV test for infection at 4–6 weeks of age, and ART should be initiated upon diagnosis of HIV infection in children aged less than 24 months (WHO, 2010a). However, implementing programmes for EID and treatment has proved challenging in Malawi (UNAIDS, 2014).

Many infants access EID late, or the diagnosis is missed (McCollum et al., 2012). A study conducted in Lilongwe, Malawi found that there was late diagnosis of HIV in infants (Braun et al., 2011). There are also high rates of loss to follow-up at every stage of the EID programme (Dube et al., 2012). More than two-thirds of infants who receive a PCR test at an under-five clinic do not return for their results or enrol into care (Leach-Lemens, 2012).

The MoH (2012) states that poor identification of HIV-exposed infants is one of the challenges on EID of HIV in Malawi. Lack of knowledge and skills on EID (testing, counselling and identification) can lead to poor testing, affect the information given to mothers, and lead to poor judgement of the presenting signs and symptoms for management of the infants. This may lead to poor identification and loss to follow-up of HIV-exposed and -infected infants. Little is known about the knowledge and skills of HCPs on EID of HIV in Mzuzu, Malawi. It is therefore imperative to investigate the knowledge and skills of HCPs in order to improve scale-up of EID services in Malawi.

### **1.3 Aim of the study**

The aim of the study is to investigate the knowledge and skills of HCPs on EID of HIV in Mzuzu, Malawi.

### **1.4 Research objectives**

The two research objectives of the study are as follows:

- To examine the knowledge of HCPs on the EID of HIV.
- To determine the skills of HCPs on the EID of HIV.

## **1.5 Significance of the study**

The research would be used to gain an understanding of HCPs' knowledge and skills about EID of HIV. The findings of the study provide relevant information to the management of the hospitals, decision-making bodies and Department of Health to assist in developing intervention strategies to scale-up EID services through strengthening the knowledge and skills of HCPs. The results and recommendations could be shared at different levels of policy making and facilitate planning of effective EID of HIV.

## **1.6 Operational definition of terms**

**An exposed child:** A child born to an HIV-infected mother but without a confirmed HIV infection, or a child exposed to infected blood products without confirmed HIV infection. In the event that a mother's HIV status is unknown, a positive rapid test in a child below 18 months of age confirms HIV exposure, but not HIV infection status (WHO, 2011).

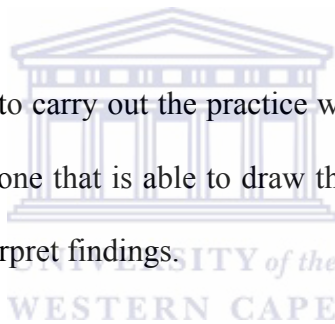
**Early infant diagnosis of HIV:** Timely diagnosing of HIV infection in infants in order to provide life-saving care to such infants. All HIV-exposed infants to have HIV virological testing at 4-6 weeks of age or at the earliest opportunity thereafter (IATT, 2012).

**Health care provider:** HCPs in this study were nurses/midwives, doctors, clinical officers and medical assistants.

**Infected child:** A child older than 18 months of age with two positive HIV rapid antibody test results, or a child below 18 months of age with one positive virological test result (e.g. DNA PCR).

**Knowledge:** In this study a knowledgeable HCP regarded as the one that scores 80% on the questions. This score has been determined based on the knowledge that HCPs undergo training before practice, and also on a USAID study on evaluation of knowledge of HCPs on HIV where a score of 80% was a good knowledge score, 70–79% was a fair score and less than 69% was a poor score (QAP Tanzania HIV Stigma Study Team, 2007).

**Skill:** Skill regarded as the ability to carry out the practice well (Cambridge English Dictionary, n.d.). A skilled HCP could be the one that is able to draw the required amount of blood and on the right site, as well as able to interpret findings.



**Infant:** A child below 12 months of age.

**Perinatal:** The period around birth, from 28 weeks' gestation to 1 week after birth.

**Postnatal:** The period occurring after childbirth.

**Antenatal:** Period before childbirth.

**Mother-to-child transmission (MTCT) of HIV:** Transmission of HIV from an HIV-positive woman to her child during pregnancy, delivery or breastfeeding.

## **1.7 Conclusion**

This chapter has served to set the context of the study by providing an introduction and background to principal issues on EID of HIV. The background has given the trend of HIV/AIDS globally, regionally and in Malawi; the trend of PMTCT globally, regionally and in Malawi; the framework, guidelines and training aspects of PMTCT and EID; as well as the practice of EID in Malawi. This chapter has also highlighted the identified problem and significance of the study.

Chapter two deals with the literature relating to PMTCT and EID of HIV.



## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter discusses a number of studies that have been conducted globally and locally pertaining to EID of HIV. A literature study provides a picture of what has been done on the topic under study. Review of the literature helps the researcher to obtain in-depth knowledge on the topic of interest, and also provides insight into how others have investigated similar research problems (Burns & Grove, 2010).

The review is organised into and presented under the following headings: an overview of infant diagnosis of HIV; MTCT; PMTCT; challenges faced on EID of HIV in Malawi; knowledge of HCPs on EID of HIV; and skills of HCPs on EID of HIV.

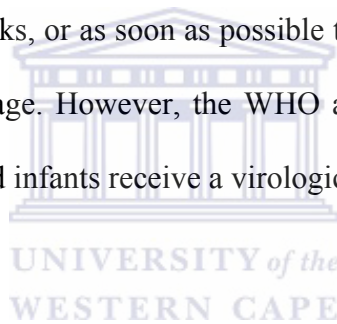


### **2.2 An overview of infant diagnosis of HIV**

EID is a critical step to prevent HIV transmission or severe morbidity and mortality (Woldesenbet et al., 2012). However, EID has received minimal attention in HIV management (Finocchiaro-Kessler et al., 2015). Infants infected with HIV during pregnancy, delivery or early postpartum often die before they are recognised as having HIV infection (UNAIDS, 2012). The primary objective of EID is to identify HIV-infected infants promptly in order to initiate life-saving ART as soon as possible (UNAIDS, 2011). In infants born from HIV-infected women, maternal antibodies cross the placenta and persist in the infants' blood for up to 18 months (Van Boxtel, Santoso & Edwards, 2008). These antibodies usually represent exposure to maternal HIV rather than true infant HIV infection.

Therefore, HIV infection cannot be diagnosed in infants less than 18 months by antibody-based tests, and in this case only virological tests (which detect viral components in the blood) can be used for an accurate diagnosis (Noubiap, Bongoe & Demanou, 2014).

The Malawi Government recognises that the key to effective HIV care and treatment is early identification of HIV-infected and -exposed children (MoH, 2012). EID programmes offer diagnosis of HIV infection at from 4 to 6 weeks of age, which facilitates provision of life-saving care and treatment to infants infected with HIV (Edoni, 2014). This is in line with the WHO, which recommends national programmes to establish the capacity to provide early virological testing of infants for HIV at 6 weeks, or as soon as possible thereafter to guide clinical decision-making at the earliest possible stage. However, the WHO and UNICEF (2010) estimated that globally only 15% of HIV-exposed infants receive a virological test by 8 weeks of age.



### **2.3 PMTCT**

PMTCT programmes are the primary strategy to decrease vertical transmission of HIV (Sinunu et al., 2014). PMTCT provides HIV counselling and testing in pregnant women, ARV prophylaxis, infant feeding options counselling, and comprehensive treatment of HIV-infected women and their families, including follow-up of infants for HIV testing (Gamaliel, 2012).

PMTCT is effective in reducing paediatric HIV infections through a four-pronged approach as recommended by the WHO, which includes prevention of HIV among women of reproductive age; prevention of unwanted pregnancies among women living with HIV; prevention of HIV transmission from women living with HIV to their infants using antiretroviral (ARV) prophylaxis; and provision of appropriate treatment, care and support to mothers living with HIV, their children, partners, and families (WHO, 2010b).

Whilst Cuba has managed to eliminate MTCT of HIV, countries globally are striving to do the same (WHO, 2015). According to UNAIDS (2014) there has been a 43% decline in new HIV infections among children in 21 countries in Africa. For instance, Botswana, Ethiopia, Ghana, Mozambique, South Africa and Zimbabwe have achieved a 50% decline in the number of new HIV infections among children. Malawi achieved the highest decline at 67% (UNAIDS, 2014). A review conducted by Kalembo and Zgambo (2012) in sub-Saharan Africa found that there was great loss of mother-child pairs to follow-up in PMTCT, further increasing the risk of vertical transmission of HIV. According to Okoli and Lansdown (2014) PMTCT programmes have suffered a series of setbacks due to inadequate human resources and under-trained HCPs. PMTCT personnel lack proper understanding of PMTCT principles and often fail to give quality counselling to women enrolled in the programme (Sinunu et al., 2014). It was also stated that the inefficiency of healthcare workers is another barrier encountered in PMTCT (Sinunu et al., 2014).



Malawi expanded PMTCT access by offering HIV-infected pregnant women lifelong ART (option B+), with the aim of reducing the rate of HIV transmission and simplifying delivery of PMTCT services in 2011 (WHO, 2014b). However, a study conducted in Lilongwe, Malawi found that while option B + led to a seven-fold increase in women starting ART in just a over a year, loss to follow-up was greater than that reported in the general HIV population accessing ART for their own health (Tweya et al., 2014). Almost half of the women who were lost to follow-up received ART once and never returned for their next appointment, leaving them at risk of vertical transmission (Tweya et al., 2014).

#### **2.4 Diagnostic tests for HIV in infants**

The definitive diagnosis of HIV infection at any age requires diagnostic testing that confirms the presence of HIV. In infants, HIV infection is diagnosed by detecting the presence of viral nucleic acid (viral RNA or viral DNA) (WHO, 2007). The DNA PCR tests directly for HIV DNA and provides a definitive diagnosis in children less than 18 months of age (Sherman et al., 2005, as cited in Anoje et al., 2012). According to the WHO (2007) early identification of HIV DNA using PCR obtained from DBT is considered as the test of choice in children less than 18 months of age.

Virological testing enables early identification of those who have HIV infection as a first step in securing their treatment and care, and also enables identification of those who are HIV exposed but uninfected, facilitating follow-up care and prevention measures that will help to ensure that they remain uninfected. In serological testing identification of HIV antigen or antibody generated as part of the immune response to HIV infection is made (WHO, 2007).

Maternal HIV antibody is transferred to the baby passively during pregnancy and then declines (with a half-life of 28–30 days in non-breastfed infants). In children older than 18 months of age serological testing should be used in the same manner as in adults.

According to the WHO (2007), serological testing is used to diagnose HIV infection in children from the age of 18 months, to identify the HIV-exposed infant, to identify those who are not likely to be HIV-infected among infants who were never breastfed or those that were weaned at least by 6 weeks, and to identify HIV-exposed children aged 9–18 months who have remained HIV seropositive and who may be HIV infected and need virological testing.

In order to identify as many HIV-exposed and -infected children as possible and provide them with care and treatment, HCPs should be knowledgeable on EID for proper management of infants and children who might have been exposed to HIV or who have signs and symptoms suggesting that they are infected.

## **2.5 EID algorithm**

EID care and management includes an algorithm and series of interventions known as the EID cascade of care. HCPs need to be conversant with the steps that are followed on EID. The cascade includes offer and acceptance of EID testing among HIV-exposed infants; accurate specimen collection, transport, and laboratory processing; relay of results to both HCPs and mothers/caregivers; and linkage to care. Below is the algorithm that is to be followed on EID in Malawi (MoH, 2014).



However, a study conducted in Lilongwe, Malawi found that large numbers of HIV-exposed infants did not access HIV testing (Braun et al., 2011). In the study (Braun et al., 2011) only 29.5% among HIV-infected infants successfully enrolled into facilities providing paediatric HIV services. Reasons for this could be that PMTCT, EID and paediatric ART services are not sufficiently integrated, resulting in high default rates, elevated levels of vertical transmission, late infant HIV diagnosis, delayed paediatric ART initiation, and high HIV- infected infant mortality (Braun et al., 2011).

Another study in the same setting found that more than two-thirds of the infants that received PCR tests at under-five clinics failed to return for their PCR result and did not enrol into EID care (McCollum et al., 2012). According to McCollum et al. (2012), almost half of HIV-exposed infants are not enrolled into EID and never receive a PCR at all, or only after acquiring an illness which is often HIV-related (McCollum et al., 2012). A similar study conducted in Zomba, Malawi also found poor follow-up of HIV testing for HIV-exposed infants (Van Lettow et al., 2011). Recent studies from Mozambique, South Africa, Kenya and Uganda show low uptake and high drop-out rates of HIV-exposed infants for HIV diagnosis and care (Hsiao, Stinson & Myer, 2013; Cook et al., 2011; Ahoua et al., 2010). These studies have shown that there is a clear need for interventions to further strengthen EID services.

Hassan et al. (2012) state that lack of knowledge and understanding of EID by service providers due to inadequate preparation affects the delivery of EID services. Deo and Sohoni (2015) state that a major constraint in scaling-up EID programmes in resource-limited countries is the unavailability of appropriate diagnostic capability.

These services may be affected as a result of provision of inadequate care, such as giving inaccurate tests, insufficient information as well as skipping the tests, and not giving adequate information to mothers with regard to infant care due to lack of knowledge. In Malawi poor identification of infants may be a result of lack of knowledge among HCPs; however, there are no studies that have investigated the knowledge of HCPs on EID, and hence the need for this study.

## **2.7 Health care providers Knowledge on EID**

Health care workers have an important role to play in identifying children at risk of HIV, providing counselling and HIV testing at an early stage to ensure that they receive optimal care, and hence need to be conversant with EID. According to the Dieleman & Harnmeijer (2006) the most frequent method used to upgrade knowledge in the health sector in resource-limited settings is off-site training courses and seminars. However, it has been proven that this intervention is not effective to improve practices of HCPs (Dieleman & Harnmeijer, 2006). In Malawi the majority of staff needed to support the integrated scale-up plan have already gone through initial training in either ART, PMTCT or both (MoH, 2012); however, EID is still lagging due to factors such as poor identification of HIV-exposed infants and loss to follow-up, which may be as a result of inadequate HCP knowledge on the provision of EID care. Providers need to be sensitised to identify signs and symptoms of HIV, or else children will be treated for opportunistic infections on multiple occasions without ever conducting an HIV test (MacPherson et al., 2012).

According to Ahmed et al. (2013) there are several challenges encountered at the provider and facility level even when HIV-exposed or ill children are brought to a health care facility, which includes lack of understanding or training in paediatric counselling and handling paediatric blood specimens (Horwood, Voce, Vermaak, Rollins & Qazi, 2010).

Studies have shown that poor documentation by HCPs leads to loss to follow-up of infants (Kalembo & Zgambo, 2012; Motswere-Chirwa et al., 2014). Consequently a study conducted in rural Kenya found that there was lack of knowledge and understanding of EID by service providers (health workers) and caregivers (parents) (Hassan et al., 2012). Service providers were inadequately prepared to implement EID effectively, despite having undergone PMTCT training (Hassan et al., 2012). Ahmed et al. (2013) found that lack of understanding or training in paediatric counselling and handling paediatric blood specimens has a serious negative impact on EID. However, no study was found in Malawi with regard to the knowledge and skills of HCPs on EID of HIV.

## **2.8 Skills of EID**

Health care workers initiating diagnostic testing for HIV should be aware of both the recommended testing procedures and the limits of any test used for the diagnosis of HIV in infants and children (WHO & UNICEF, 2010). Thus it is a need that HCPs have skills that are needed to diagnose HIV-exposed infants, such as HIV testing skills, communication skills and counselling skills.

A missed diagnosis in the first year of life frequently results in death of the HIV-infected infant. According to the WHO and UNICEF (2010), follow-up services and regular clinical assessments to determine whether there is a presumptive diagnosis of severe HIV disease must be done for all exposed infants and those who have been diagnosed as HIV positive based on antibody testing alone, in cases where viral tests are not available.

Training and skills building to better understand paediatric testing, counselling skills and how to draw blood in infants so as to identify infected and exposed children is required by health workers. A study conducted in Uganda found that a quarter of health care workers lacked paediatric counselling skills, and it was recommended that they be trained to develop skills such as counselling skills and how to build beneficial relationships with caregivers so as to improve care services (Rujumba, Mbasaalaki-Mwaka & Ndeezi, 2010). Zeichner and Read (2005) stated that a lack of skills of health professionals in managing cases, is one of the challenges in paediatric HIV care. Inadequate skills to identify infected and exposed infants can lead to missed diagnoses, which will then deny the infected infants appropriate treatment, leading to death. Inadequate skills among health workers not only affect quality of services provided, but also have direct implications for the motivation of health workers (Ojaka, Olango & Jarvis, 2014).

## **2.9 Conclusion**

Literature review show that the rate of infant HIV transmission in Malawi remains high. Due to this fact, EID is a clear need. EID of HIV is an important step to reduce mortality and morbidity as well as prevent transmission of HIV in infants. However, studies have shown that EID has a lot of challenges, including lack of knowledge and skills among HCPs.

HCPs need to be knowledgeable and skilled as they are the persons who identify infants and give them the proper care. This review has shown that despite the work PMTCT services are doing in the paediatric HIV, there is a need for back-up in case the mother was missed in PMTCT strategies. Thus the EID of HIV should be considered a high priority as it has been shown that there is an increased risk of vertical transmission due to so many challenges in the implementation of PMTCT services.

Chapter three will explain the methodology of the study.





## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter discusses the methodology that was used to conduct the study. Research methodology refers to methods used by the researcher to obtain subjects, collect data, analyse the data and interpret the results. The methodology includes research approach, research design, sampling strategy, instrumentation, data collection procedure, data analysis techniques and interpretation of results.

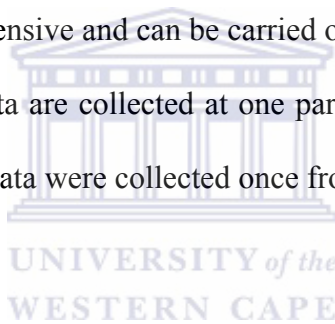
### **3.2 Research approach**

The study used a quantitative research approach – a formal, objective, systematic process in which numerical data are used to obtain information about the world (Burns & Grove, 2010). This is used to describe variables, examine relationships among variables, and determine cause and effect interactions between variables (Burns & Grove, 2009). Quantitative research gives an explanation of the phenomenon by collecting numerical data that are analysed using mathematically based methods, and statistics in particular (Muijs, 2010). A quantitative method was chosen because numerical values were used to collect information from the respondents to investigate the knowledge and skills of HCPs on EID of HIV, and also because new information with regard to the knowledge and skills of HCPs was gathered. The research design is discussed below.

### **3.3 Research design**

A research design is an overall plan for conducting a study with maximum control over factors that may interfere with the validity of the findings (Burns & Grove, 2009).

The selection of a population, sampling procedure, methods of measurement as well as a plan for data collection and analysis are directed by the type of design. According to Burns and Grove (2009), the choice of research design depends on the researchers' expertise, the problem and purpose of the study, and the desire to generalise the findings. A descriptive cross-sectional design employing a quantitative method was used. Burns and Grove (2010) state that a descriptive study is designed to gain more information about characteristics within a particular field of study. A descriptive method was chosen because the purpose of the study was to investigate the knowledge that the HCPs have on EID of HIV, and a descriptive study design provides a picture of situations as they naturally happen (Burns & Grove, 2010). It is also appropriate as it is relatively inexpensive and can be carried out in a short space of time. A cross-sectional study is one in which data are collected at one particular point in time (Wang, 2014), and this type was chosen because data were collected once from the sample.



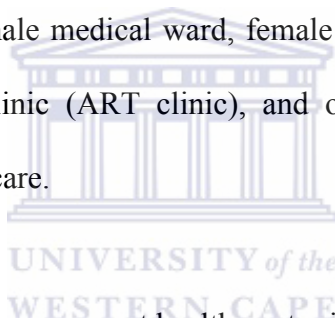
### **3.4 Setting**

The study setting was at Mzuzu, Malawi's third largest city, which is located 400 km north of the capital city Lilongwe. Mzuzu covers an area of 76 square kilometres and has a population of 209 100 (MOH, 2014). The city has one tertiary hospital (Mzuzu Central Hospital), one government health centre (Mzuzu Health Centre) and two Christian Health Association of Malawi (CHAM) hospitals (Ekwendeni Mission hospital and St John's Mission Hospital).

**Ekwendeni Hospital** is situated in the north of Malawi, about 20 km from Mzuzu. It is a general hospital with 183 beds, serving a catchment area of 45 000 with a wider referral area of 120 000.

The hospital has over 100 HCPs and sees over 21 000 outpatients every year, of whom over 7000 are usually admitted. It accommodates 3000 births a year. The hospital has five wards: male, female, paediatrics, maternity and a private ward, and also an outpatients department (Christian Medical Fellowship, 2015). The hospital offers PMTCT and EID services.

**Mzuzu Central Hospital** has 300 beds and is one of the advanced hospitals in the area. It is the main tertiary care hospital for the northern region and serves referrals from the whole northern region, thus a population of 2 090 600. It has more than 200 HCPs (Chief Nursing Officer, personal communication, August 13, 2014). It has maternity ward (labour and antenatal), paediatric ward, postnatal ward, male medical ward, female medical ward, male surgical ward, female surgical ward, rainbow clinic (ART clinic), and outpatients department. It provides ART/PMTCT and paediatric HIV care.



**Mzuzu Health Centre** is the only government health centre in Mzuzu city, where all patients are treated for minor illnesses; uncomplicated obstetric cases (deliveries) are also looked after at this level. All complicated cases are referred from this level to Mzuzu Central Hospital. It situated at the centre of the city and is 5 km from Mzuzu Central Hospital and 20 km from Ekwendeni Mission Hospital. It has over 40 HCPs (District Nursing Officer, personal communication, September 18, 2014). The hospital offers PMTCT and EID services.

These hospitals were chosen because they could provide the necessary sample size, were easily accessible to the investigator and offered EID and PMTCT services.

### 3.5 Population

A population or target population is the entire set of elements (individuals, objects, or substances) that meet the sampling criteria for a study (Burns & Grove, 2009). The population for this study consisted of all HCPs (nurses/midwives, doctors, medical assistants and clinical officers) working in maternity, the paediatric ward or under-five clinic of the selected three health facilities in Mzuzu. This population was chosen because it comprises those HCPs that handle infants with different needs (immunisations, postnatal visits, integrated management of childhood illness (IMCI), and hence who need to be knowledgeable and skilled on EID. A total of 98 HCPs were working in the above mentioned three health facilities: 4 medical officers, 23 nursing officers, 21 clinical technicians, 6 medical assistants and 44 nurse midwife technicians. Table 3.1 shows the distribution of the total number of HCPs at each hospital.

**Table 3.1: Population**

	<b>Mzuzu Central Hospital</b>	<b>Ekwendeni Hospital</b>	<b>Mzuzu Health Centre</b>	<b>Total</b>
<b>Paediatric ward</b>	18	9	-	27
<b>Maternity</b>	21	10	10	41
<b>Under-five clinic</b>	+ Rainbow clinic 6	10	14	30
<b>Total</b>	45	29	24	98

### 3.6 Sampling

Sampling is a procedure to select a group of people, events, behaviour or other elements upon which to conduct a study, and a sample is a subset of a population that is selected for a particular study (Grove, Burns & Gray, 2012).

Three hospitals were randomly selected out of five hospitals. Quantitative research necessitates large samples for reasons of representativeness and generalisability. Due to a small population size, a census of all 98 HCPs was conducted. The following were considered as criteria for inclusion in the study: HCPs who were working at least for three months in maternity, an under-five clinic or paediatric ward on both shifts (7:30 a.m. – 4:30 p.m. and 4:30 p.m. – 7:30 a.m.), who were willing to participate in the current study and were present at the hospital on the day and time of data collection.

### **3.7 Data collection instrument**

A closed-ended self-administered questionnaire was used to collect data related to EID of HIV among HCPs. The questionnaire was developed by the researcher using the training modules on PMTCT and paediatric HIV care in low-resource settings from the CDC (Vandenberg et al., 2012) and from a guideline on paediatric HIV management in Malawi (MoH, 2014), as well as a PMTCT generic training package (WHO & CDC, 2008) which also addressed IMCI. One question was adapted from a tool used for assessment of EID of HIV in primary health care in South Africa (Woldesenbet et al., 2012). The training modules on PMTCT and paediatric HIV care in low-resource settings from CDC and the PMTCT generic training package were chosen to develop the questionnaire because they focus on improving training of HCPs in PMTCT and paediatric HIV care, which is the focus of the study. A guideline on paediatric HIV management in Malawi was chosen because Malawi is where the study took place, and hence utilisation of the guideline was necessary.

The questionnaire was developed from different sources and no one source was fully adopted because not all of the questions were related to EID of HIV; hence the researcher selected the ones that were relevant in investigating the knowledge and skills of HCPs on EID of HIV.

The questionnaire had multiple-choice questions, and consisted of three Sections: section A was on the demographics of the respondents; section B comprised questions related to knowledge; and section C consisted of questions related to skills. The questionnaire was developed in English with an understanding that all HCPs can speak and write in English as it is the official language of the country.

### **3.8 Validity and reliability**

The quality of a research instrument is determined by its validity and reliability. According to Burns and Grove (2010), the validity of an instrument is a determination of how well the instrument reflects the abstract concept being examined, whilst reliability deals with the consistency of the measurement instrument.

#### **3.8.1 Validity**

Validity is the accuracy and faithfulness of scientific findings (Brink, Van der Walt, & Rensburg 2006), and the extent to which an instrument measures what it is supposed to measure and performs as it is designed to perform (Biddix, 2014). In this study face, content and external validity were ensured.

According to Polit and Beck (2008), **face validity** refers to the extent to which an instrument looks as though it is measuring what it purports to measure. This was ensured through consulting experts in PMTCT and EID, the supervisor and the statistician. **Content validity** refers to the appropriateness of the content of an instrument – thus if the questions accurately assess what the researcher wants to know. Table 3.2 shows the questions and their origin. The instrument was tested on five participants before the actual study to ensure that all important areas of concern were reflected in it. The participants were requested to indicate whether they had difficulties in answering the questions, and none of the five had any difficulties.

**Table 3.2: Data collection instrument**

<b>Origin</b>	<b>Questions</b>
PMTCT and paediatric HIV care in low-resource settings from CDC	7, 8, 9, 13, 14
PMTCT generic training package from WHO and CDC	13, 15, 16
A guideline on paediatric HIV management in Malawi	10, 11, 12, 21, 23, 24, 25, 26, 27
A tool used for assessment of EID of HIV in primary health care in South Africa	22

### **3.8.2 Reliability**

Reliability is the degree of consistency, stability and repeatability in participants' results given the same initial circumstances (Brink, Van der Walt & Rensburg, 2006). Reliability was enhanced by test-retest to determine the internal consistency of the instrument. Test-retest is an estimate of reliability that involves comparing two administrations of the same test to the same participants (Dane, 2010). Since the test is administered twice to the same participants, the true score has to be relatively constant.

Test-retest was obtained by allowing participants to take and retake the test after 5 days and comparing the performances. Five HCPs participated in the pre- and post-test. Each particular score on the first administration was correlated with their scores on the second administration. The test-retest result was 0.895, which is within the range of good reliability. There was no difference in the first and second scores of all the participants, thus the correlation was stronger and hence the test-retest reliability was good. In this study the sample was clearly stated and represented the population, and there was no use of artificial laboratory, hence the external validity was ensured.

**Table 3.3: Test-retest correlations**

		<b>Test 1</b>	<b>Test 2</b>
<b>Test 1</b>	Pearson correlation	1	0.895
	Significance (two-tailed)		0.040
	N	5	5
<b>Test 2</b>	Pearson correlation	0.895	1
	Significance (two-tailed)	0.040	
	N	5	5

Correlation is significant at the 0.05 level (two-tailed).

### **3.9 Data collection**

Permission to carry out the research was obtained from the Malawi National Health Science Research Committee and the hospital managers and heads of departments. The participants were met in their departments where they were asked to participate in the cross-sectional survey. The researcher explained the aim of the study, its significance and its benefits to the participants and addressed any queries related to the study that the participants had. Three were not willing to participate.



Those who agreed to participate (74) were given an informed consent page to read. The participants were then requested to give their written consent. Those who did not wish to participate in the survey (3) were allowed to do so. The participants were asked to complete the questionnaire when they had time during the day and to return it the same day if they had time. Those who did not have time were requested to hand it in the following day. The researcher was at each hospital for two days to hand out questionnaires from 8:30 a.m. to 5:30 p.m. in order to meet HCPs in both the day shift from 7:30 a.m. – 4:30 p.m. and the night shift which starts from 4:30 p.m. to 7:30 a.m. Follow-up communication took place with those who did not return on the agreed time.

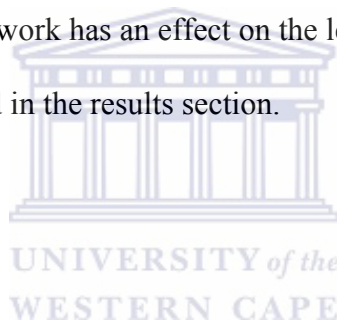
### **3.10 Data analysis**

Data analysis reduces, organises and gives meaning to the data (Grove, Burns & Gray, 2012). The researcher conducted the data analysis with the help of a statistician. The raw data were cleaned, coded and prepared for entry into the computer software Statistical Package for Social Science (SPSS) version 23. Descriptive statistics in the form of bar graphs and frequency tables were used to analyse the data. Descriptive statistics are employed to describe and summarise data in a condensed manner that is organised and represented visually (Brink, Van der Walt & Rensburg, 2006).

The chi-square test of association (with significance considered at a P value < 0.05) was used to conduct bivariate analysis on categorical variables of interest. This was done to determine whether there were any associations and if associations were statistically significant.

The level of significance was set at 0.05, meaning that the confidence level that the researcher used at all times was 95%; thus there is 95% chance of the results being right. The researcher was interested in finding out the relationship between knowledge and qualification, and skills and department of work. The null hypothesis was that qualification has an effect on the level of knowledge one has on EID. The individual question scores were combined to formulate a total score to ensure that the tests did not violate the expected cell counts for chi square. Cross-tabulation for qualification and knowledge found that more than two cells (33.3%) had a cell count of less than 5; hence likelihood ratio was used. Cross-tabulation for department of work and skills used the chi-square test and the rules of chi square were not violated. The null hypothesis was that department of work has an effect on the level of skills that one has on EID.

The cross-tabulations are presented in the results section.



### **3.11 Ethics statement**

Respect for persons was ensured through treating participants as autonomous agents, as they were informed that their participation in the proposed study was voluntary and that they had the right to withdraw from the study any time without a penalty. A right to protection from discomfort and harm was respected; for instance, in case of psychological/emotional effects as a result of this study, it was planned that participants would be referred for counselling services. However nothing of this sort occurred. An explanation was given to the participants that the information would only be accessible by the researcher, supervisor and the statistician to ensure privacy. No identification details were used on the questionnaires; however, code numbers were assigned to the questionnaires so that the participant's identity cannot be linked to the responses to ensure anonymity.

All of the questionnaires will be kept in a secure place under lock and key for five years after the results have been published to ensure confidentiality.

All participants were given written informed consent forms and the choice of whether or not they wished to participate in the study. Detailed information on the aim, objectives and potential benefits of the study, how data were to be collected and voluntary participation was given to the respondents. The consent form was signed before collecting data. To ascertain that respondents understood the contents of the informed consent, they were given an opportunity to ask questions. Respondents were asked to sign the consent form after they indicated that they understood all the essential information pertaining to the proposed study. Respondents were also informed about the possible publications and dissemination of results or the use of results for media. Ethical approval was obtained from Senate Research Committee of the University of the Western Cape and Malawi National Health Sciences Research Committee.



### **3.12 Conclusion**

This chapter discussed the research design and method, the setting, study population, data collection instrument, reliability and validity, data collection process as well as ethical considerations.

Chapter four will present the findings of the study.

## **CHAPTER FOUR: FINDINGS OF THE STUDY**

### **4.1 Introduction**

This chapter presents the results and summary of the statistical analysis used to achieve the research objectives. The objectives were: (1) to examine the knowledge of HCPs on EID of HIV; and (2) to determine the skills of HCPs on EID of HIV. Of the sample of 98, 74 questionnaires issued to HCPs, 72 questionnaires were returned to the researcher, yielding a 74% response rate; however, 4 questionnaires were incomplete and were excluded from the results, and 2 questionnaires were not returned. In total the results from 68 respondents (94%) will be presented in this section.



### **4.2 Demographic data**

Demographic data for age and sex distribution are presented in Table 4.1, on qualifications in Figure 4.1, years of practice in Table 4.2, position of work in Figure 4.2, and department of work and years of practice in Table 4.2.

#### **4.2.1 Age and sex distribution of respondents**

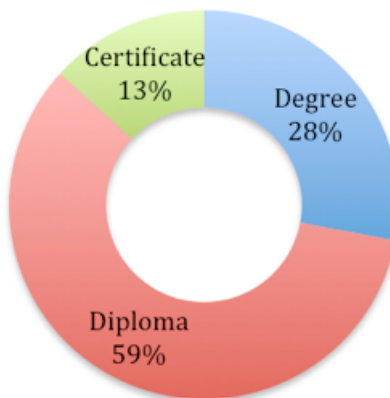
Table 4.1 shows the distribution of age and sex among the respondents. Of the 68 respondents, 28 (41.2%) were aged 20–30 years, 23 (33.8%) were aged 31–40 years, 8 (11.8%) were aged 41–50 and 9 (13.2%) were aged 51 years and above. The majority of the participants 48 (71%) were female and only 20 (29%) were male.

**Table 4.1: Age and sex distribution**

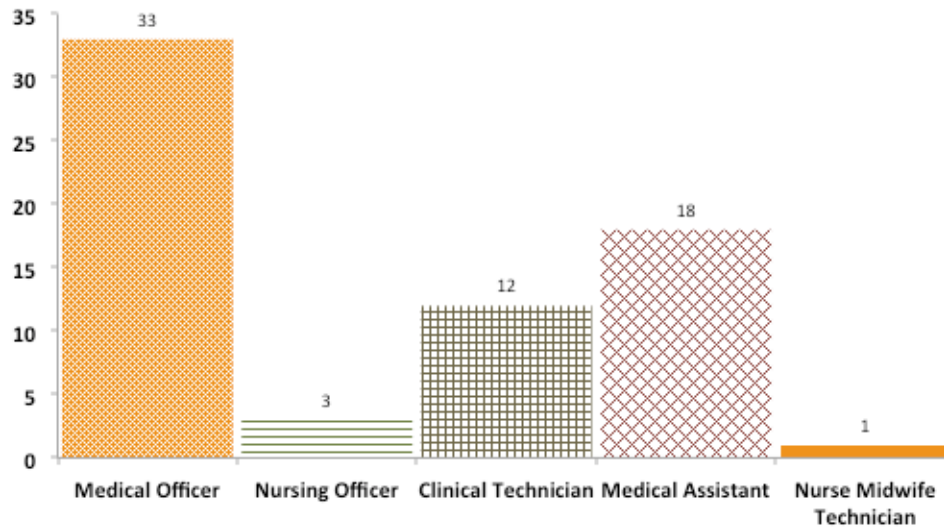
	<b>Frequency</b>	<b>Percentage</b>
<b>Age range (yrs)</b>		
20–30	28	41.2
31–40	23	33.8
41–50	8	11.8
51 and above	9	13.2
<b>Sex</b>		
Male	20	29
Female	48	71

#### **4.2.2 Qualification distribution and position of respondents**

Figure 4.1 shows the qualifications of respondents. Of the 68 respondents, 59% (40) had diplomas, 28% (19) had degrees, and 13% (9) had certificates. Nurse midwife technicians 33 (48.5%) were the largest group of respondents, followed by nursing officers 18 (26.5%), clinical technicians 12 (17.6%), medical assistants 4 (5.9%), and lastly 1 (1.5%) medical officer, as shown in Figure 4.2.



**Figure 4.1: Qualification distribution.**



**Figure 4.2: Respondents' position of work.**

#### 4.2.3 Department of work and years of practice in the department

Table 4.2 shows the distribution of respondents' department of work and years of practice. With regard to department of work, 27 (39.7%) respondents were from an under-five clinic, 25 (36.8%) from the paediatric ward and 16 (23.5%) from the maternity department. Most participants 46 (67.6%) had worked in their department for 1–3 years, 16.2% had worked there for 4–6 years, 7 (10.3%) for 7–10 years and 4 (5.9%) for over 11 years.

**Table 4.2: Respondents' department of work and years of practice**

		Frequency	Percentage
<b>Department</b>	Paediatric	25	36.8
	Maternity	16	23.5
	Under-five clinic	27	39.7
	Total	68	100
<b>Years of work in the department</b>	1–3	46	67.6
	4–6	11	16.2
	7–10	7	10.3
	11 and above	4	5.9
	Total	68	100

### **4.3 Knowledge of HCPs on EID of HIV**

Knowledge was assessed by using 10 questions with 19 responses; two questions had several correct responses, which required the respondent to select all that applied. Total possible score was 19 points. A respondent who was not able to provide the correct responses was considered a fail on this item. Table 4.3 shows the performance of respondents to each of the knowledge questions (Q7–Q14), and a clear picture of how the respondents performed on each multiple-choice response.



**Table 4.3: Responses to individual knowledge questions**

Question Number	Indicator	Responses	Frequency	Percentage
7	Meaning of exposed infant	<b>All children who are born to HIV-infected mothers are HIV exposed</b>	67	98.5
		All HIV-exposed children are infected	0	0
		None of the above	1	1.5
8	Meaning of infected infant	All children who are born to HIV-infected mothers are HIV exposed	3	4.4
		All HIV-exposed children are infected	2	2.9
		<b>A child who is infected with HIV in his or her body</b>	63	92.7
9	Who gets cotrimoxazole prophylaxis	Only infected infants	10	14.7
		<b>All HIV-exposed infants</b>	56	82.4
		None of the above	2	2.9
10	Number of tests offered for an exposed child	4 tests	16	23.5
		2 tests	8	11.8
		<b>3 tests</b>	44	64.7
11	When is first test offered	10 weeks	9	13.3
		14 weeks	6	8.8
		<b>6 weeks</b>	53	77.9
12	When to offer second test	6 months	18	26.5
		<b>12 months</b>	36	52.9
		24 months	14	20.6
13	When to give cotrimoxazole to an HIV-exposed infant	<b>At 6 weeks</b>	59	86.7
		At 1 week	1	1.5
		At birth	8	11.8
14	Meaning of positive antibody test at less than 18 months	Child is infected	13	19.1
		Child not infected	1	1.5
		<b>Need for confirmation test</b>	54	79.4



#### **4.3.1 Meaning of HIV-exposed and -infected infants (Q7 & Q8)**

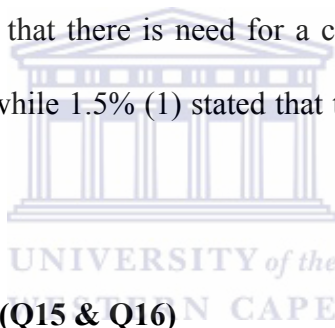
Knowledge scores on the meaning of HIV-exposed (Q7) and HIV-infected infant (Q8) were generally high. Almost all the HCPs knew that all children who are born to HIV-infected mothers are exposed; thus 98.5% (67) respondents were right and only 1.5% (1) was incorrect. When asked the meaning of HIV-infected infant, 92.7% (63) respondents knew that a child who is infected with HIV in his or her body is HIV infected, while 2.9% (2) respondents stated that all exposed children are infected and 4.4% (3) respondents stated that all children who are born to HIV infected mothers are HIV exposed.

#### **4.3.2 Cotrimoxazole prophylaxis (Q9 & Q13)**

As to which infants receive cotrimoxazole (Q9), 82.4% (56) respondents knew that all HIV-exposed infants are supposed to receive cotrimoxazole; 14.7% (10) respondents stated that only infected infants are to get cotrimoxazole and 2.9% (2) stated that none of the exposed and infected infants are to get cotrimoxazole, hence both responses were incorrect. In response to the age at which exposed infants receive cotrimoxazole (Q13), 86.8% (59) correctly indicated 'at six weeks'; 11.8% (8) indicated at birth and 1.5 % (1) indicated at one week, hence 13.2% were incorrect.

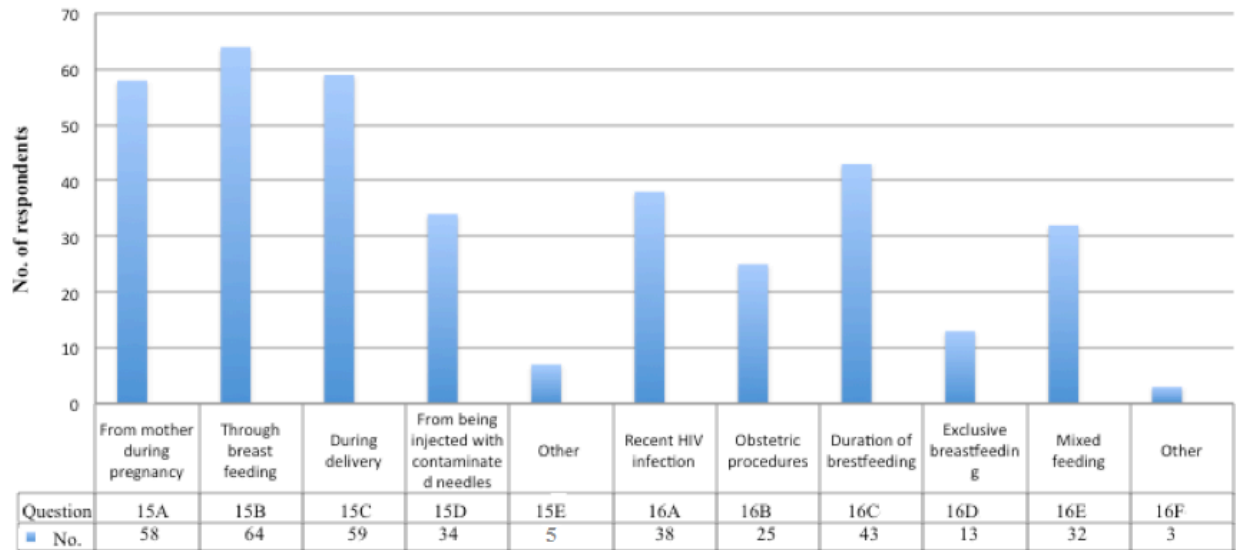
### **4.3.3 Diagnostic tests (Q10, Q11, Q12 & Q14)**

At least two-thirds of the respondents 64.7% (44) correctly stated that three tests are offered for an exposed infant (Q10); 23.5% (16) respondents stated four tests and 11.8 (8) respondents stated two tests, hence 35.3% were incorrect. Most of the respondents 77.9% (53) were familiar with the age at which the first test is offered (Q11); however, 13.3% (9) respondents stated at 10 weeks and 8.8% (6) respondents stated at 14 weeks, hence both answers were incorrect. Of the 68 respondents 52.9% (36) knew that the next infant test is offered at 12 months (Q12); 26.5% (18) respondents indicated at 6 months and 20.6% (14) indicated at 24 months, thus both answers were incorrect. In response to Q14 on the meaning of a positive antibody test at less than 18 months, 79% (54) correctly stated that there is need for a confirmation test; 19.1% (13) stated that it means the child is infected while 1.5% (1) stated that the child is not infected, hence both responses were incorrect.



### **4.3.4 HIV transmission to infant (Q15 & Q16)**

Figure 4.3 shows respondents responses on newborn child HIV transmission; respondents were asked to tick all the responses that were correct. Responses included MTCT during pregnancy, which yielded 71% (48 responses), breastfeeding received 94% (64 responses), during delivery 87% (59 responses), being infected with contaminated needles 50% (34 responses), and 'other', such as when a baby has sores in the mouth 7% (5 responses).



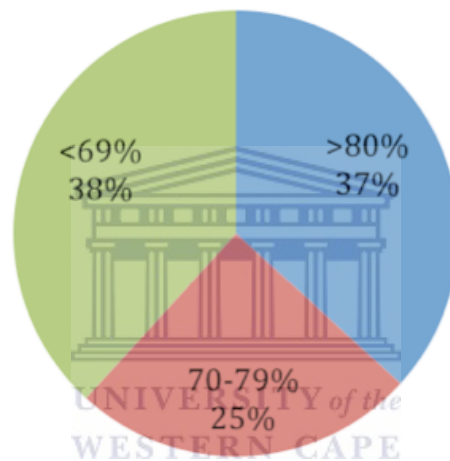
**Figure 4.3: Responses on infant HIV transmission.**

Responses to factors that increase the risk of a woman transmitting HIV through breastfeeding (Q16) varied greatly among respondents. Only for duration of breastfeeding (Q16C) did the majority 63% (43) of respondents assign risk for transmission, followed by recent HIV infection (Q16A) with 56% (38) responses, then mixed feeding (Q16E) with 47% (32) responses. Risk ratings through other means were lower 37% (25) for obstetric procedures (Q16B), 19% (13) for exclusive breastfeeding (Q16D) and 4.4% (3) for ‘other’ (Q16F) such as oral thrush, mastitis and cracked nipples.

#### **4.3.5 Total knowledge score**

The knowledge score ranged from 31% (6) to 100% (19), with a mean of 68% and mode of 70%. A respondent’s total knowledge score was the total number of points earned out of the total knowledge questions.

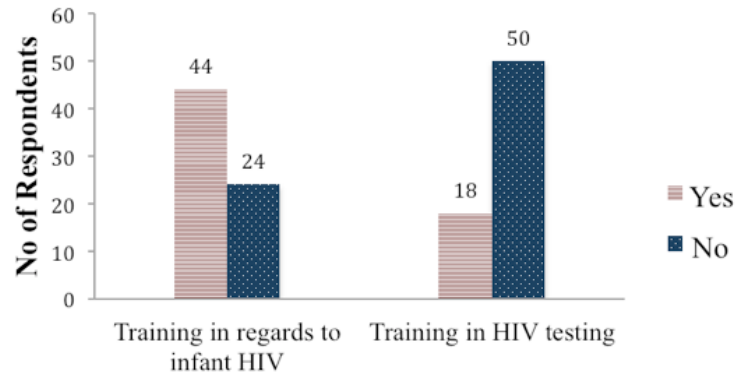
A study by USAID on evaluation of knowledge of HCPs on HIV classified scores as follows: good >80%, fair 70–79%, and poor <69% (QAP Tanzania HIV Stigma Study Team, 2007). In this study the researcher adopted the same principles to classify knowledge scores as good >80%, fair 70–79%, and poor <69%. Two questions were worth 9 points, giving the overall score of 19 points. When categorised as good, fair and poor, as shown in Figure 4.4, 38% (26) respondents had a poor score, 25% (17) respondents had a fair score, and 37% (25) had a good score.



**Figure 4.4: Total knowledge score.**

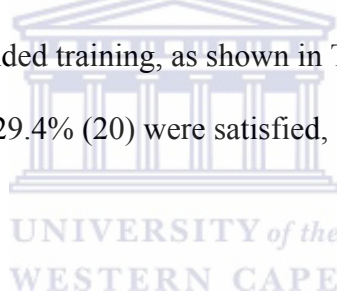
#### **4.4 Training attendance**

Of the 68 respondents, 65% (44) had attended training with regard to infant HIV (Q17), while 35% (24) had not attended such training. As regards training on infant HIV testing (Q19), only 26% (18) respondents had attended and 74% (50) respondents had not.



**Figure 4.5: Respondents who had attended training on infant HIV and HIV testing.**

In respect of adequacy of training content on infant HIV (Q18), 42.6% (29) felt it was adequate, 8.8% (6) felt it was not adequate, 13.2% (9) were not sure, and in 35.3% (24) of cases this was not applicable as they had not attended training, as shown in Table 4.4. As regards satisfaction of knowledge on EID of HIV (Q20), 29.4% (20) were satisfied, 60.3% (41) were not satisfied and 10.3% (7) were not sure.



**Table 4.4: Training questions regarding content**

Question	Question content	Response	Percentage	Frequency
18	Adequacy of content	Yes	42.7	29
		No	8.8	6
		Not sure	13.2	9
		Not applicable	35.3	24
20	Knowledge satisfaction on EID of HIV	Yes	29.4	20
		No	60.3	41
		Not sure	10.3	7

#### 4.5 Skills of HCPs on EID

Skills of the HCPs were assessed using 10 questions. The assessment was a Likert scale for one question (Q21) and either right or wrong for Q22 to Q30; thus a respondent who was not able to provide the correct response was considered to fail on that specific question. One question that used ratings as assessment criteria is shown in section 4.5.1.

##### 4.5.1 Capability rating on EID performance

Respondents were asked to rate their capability to perform EID. A Likert scale ranging from excellent, good, average, fair and poor, similar to that in a study on factors that affect performance of professional nurses in Namibia (Awases, Bezuidenhout & Roos, 2013), was used. Of the 68 respondents 19% (13) had good performance, 51% (34) had an average performance and 30% (20) had a fair performance; none had either an excellent or poor performance, as shown in Figure 4.6.

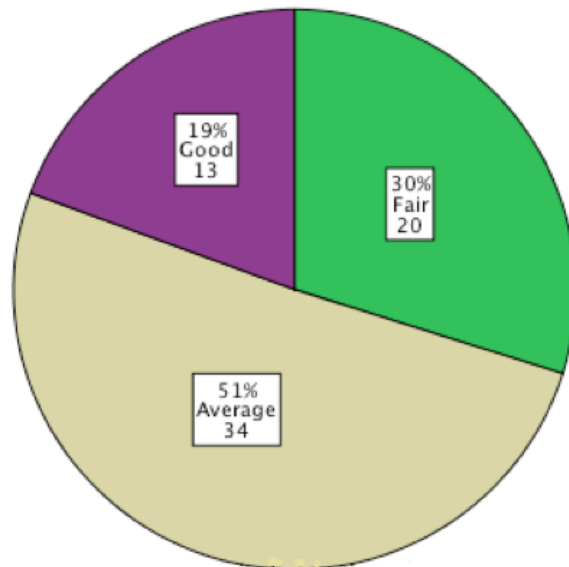


Figure 4.6: Individual performance rating on EID

#### **4.5.2 Questions on skills**

Table 4.5 shows the respondents' responses to individual knowledge questions, showing the number of respondents and indicating how many got each question right or wrong. A description of responses is also provided. The total scores of the respondents pertaining to skills are described below.



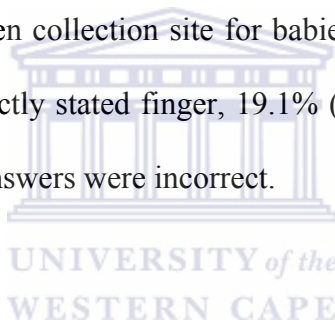
**Table 4.5: Individual practice skills questions**

<b>Question</b>	<b>Question content</b>	<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
22	PCR test provision for infants without mothers	<b>Yes</b> No I don't know	52 10 6	76.5 14.7 8.8
23	Blood specimen collection in babies <6 kg	<b>Heel</b> Toe Finger	50 11 7	73.5 16.2 10.3
24	Blood specimen collection in babies <10 kg	Heel <b>Toe</b> Finger	12 42 14	17.6 61.8 20.6
25	Blood specimen collection in babies >10 kg	Heel Toe <b>Finger</b>	13 15 40	19.1 22.1 58.8
26	Meaning of presumed AIDS	Assuming in certain circumstances without definitive diagnosis  <b>Making a diagnosis using clinical signs for presumed severe HIV disease</b>  Test kits not available	15  53  0	22.1  77.9  0
27	When a presumed diagnosis is made	<b>When a child is &lt;12 months of age and rapid test positive</b> Test kits not available  Clinical urgency requires the clinician to consider ART	43  9  16	63.3  13.2  23.5
28	Interpreting a positive antibody test	HIV infected HIV exposed <b>May or may not be infected</b>	20 18 30	29.4 26.5 44.1
29	Use of antibody test in infants	Diagnosing HIV infection <b>Screening for exposure</b> None	45 22 1	66.1 32.4 1.5
30	Use of virological test in infants	<b>Diagnosing HIV infection</b> Screening for exposure None	42 26 0	61.8 38.2 0



#### **4.5.3 Skills on PCR testing blood sample collection and site (Q22-Q25)**

Regarding practices of PCR testing sample collection skills (Q22), more than three-quarters of the respondents 76.5% (52) were in line with the guidelines on the provision of PCR testing to infants that come with caregivers other than the mother, 14.7% (10) respondents indicated that they do not provide this and 8.8% (6) respondents did not know whether they provide it or not. When respondents were asked where they draw blood in infants who weigh <6 kg (Q23), 74% (50) respondents correctly stated the heel, 16% (11) stated the toe, and 10% (7) stated the finger. With regard to blood specimen collection in babies 5–10 months old weighing <10 kg (Q24), 62% (42) respondents correctly stated toe, 18% (12) stated heel and 20.6% (14) stated finger. On (Q25) regarding blood specimen collection site for babies >10 kg, 58.8% (40) respondents were familiar with it as they correctly stated finger, 19.1% (13) respondents stated heel, 22.1% (15) respondents stated toe, both answers were incorrect.



#### **4.5.4 Presumed AIDS diagnosis (Q26 & Q27)**

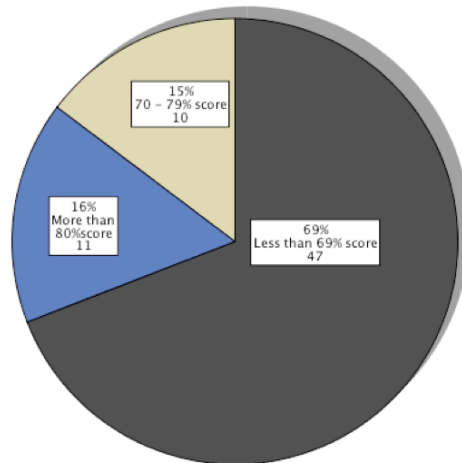
On the meaning of presumed AIDS diagnosis (Q26), 77.9% (53) respondents stated correctly that presumed AIDS diagnosis is making a diagnosis using clinical signs for presumed severe HIV infection and 22.1% (15) respondents stated that the meaning of presumed AIDS is assuming in certain circumstances without definitive diagnosis hence were incorrect. Regarding when a presumed diagnosis is made (Q27), 63.3% (43) respondents knew when a presumed diagnosis is made whilst 13.2% (9) respondents stated that when test kits are not available, and 23.5% (16) respondents stated that clinical urgency requires the clinician to consider ART, both answers were incorrect.

#### 4.5.5 Virology and antibody interpretation (Q28-Q30)

Fewer respondents 44.1% (30) correctly stated that an antibody test in infants may or may not indicate infection (Q28), and 29.4% (20) respondents indicated HIV infected whilst 26.5% (18) respondents indicated HIV exposed, both answers were incorrect. Whilst only 32.4% (22) respondents correctly stated that antibody tests in infants are used to screen for exposure in infants (Q29), 66.1% (45) respondents stated that antibody tests in infants are used for diagnosing HIV infection and 1.5% (1) stated that there was no right answer for the question hence both answers were incorrect. With regard to the use of virological testing, 62% (42) respondents were right and 38% (26) respondents were incorrect.

#### 4.5.6 Total skills score

Figure 4.7 shows the total practical skills scores. As previously stated, participants' total practice skills score was the total number of points earned out of the total knowledge questions. Out of the 68 respondents, 69% (47) scored <69%, 15% (10) scored within 70–79%, and only 16% (11) scored >80%.



**Figure 4.7: Total skills scores.**

#### 4.6 Correlation between qualification and total knowledge score cross-tabulation

Table 4.6 below shows the results of the cross-tabulation of the qualifications of respondents versus total knowledge scores, and is presented based on those who scored <69%, those who scored 70–79% and those who scored 80% and above. While less than 3 (4.4%) of the respondents with a degree scored <69%, 18 (26.5%) of respondents with diplomas scored <69% and 5 (7.4%) respondents with certificates also scored <69%. Of the 19 (28%) respondents with degrees, 1 (1.5%) scored within 70–79%, 13 (19%) respondents of the 40 (59%) with diplomas also scored within 70–79%, and 3 of the 9 with certificates scored within 70–79%. Of the 19 (27.9%) respondents with degrees, 15 (22.1%) scored >80%, 9 (13.2%) of the 40 (58.8%) with diplomas scored >80%, and 1 (1.5%) of the 9 (13.2%) respondents with certificates also scored >80%.

**Table 4.6: Qualification and total knowledge score cross-tabulation**

			Total knowledge score				
			<69%	70-79%	>80%	Total	P value
What is your qualification?	Degree	Count	3	1	15	19	<0.001
		% of total	4.4%	1.5%	22.1%	27.9%	
	Diploma	Count	18	13	9	40	
		% of total	26.5%	19.1%	13.2%	58.8%	
	Certificate	Count	5	3	1	9	
		% of total	7.4%	4.4%	1.5%	13.2%	
	Total	Count	26	17	25	68	
		% of total	38.2%	25%	36.8%	100%	

The association between knowledge and qualification was tested as shown in Table 4.4, to see if there was any relationship between one's qualification and the knowledge that one has. The likelihood ratio was used instead of chi square as the chi-square assumption was violated because more than four cells (44.4%) had counts of less than 5. The P value less than 0.001, which is less than the alpha value of 0.05; hence there is a significant association between knowledge and qualification, and therefore we can accept the null hypothesis that qualification has an effect on the level of knowledge one has on EID.

#### **4.7 Correlation between department of work and total skills score cross-tabulation**

The results of cross-tabulation of department of work against total practical skills score is presented based on respondents who scored <69%, those who scored 70–79% and those who scored 80% and above, as shown in Table 4.7. Of the 69.1% (47) respondents who <69%, 14 (20.6%) were from a paediatric ward, 13 (19.1) were from a maternity department and 20 (29.4%) were from under-five clinics. Of 10 (14.7%) respondents who scored 70–79%, 3 (4.4%) were from a paediatric ward, 3 (4.4%) from a maternity ward and 4 (5.9%) from an under-five clinic. Whilst 8 (11.4%) respondents from a paediatric ward and 3 (4.4%) from an under-five clinic scored >80%, none from a maternity department did so.

**Table 4.7: Department and skills score cross-tabulation**

			Total practical skills score				
			<69%	70-79%	> 80%	Total	P value
Department of work	Paediatric ward	Count	14	3	8	25	.040
		% of total	20.6	4.4	11.4	36.8	
	Maternity	Count	13	3	0	16	
		% of total	19.1	4.4	0	23.5	
	Under-five clinic	Count	20	4	3	27	
		% of total	29.4	5.9	4.4	39.7	
	Total	Count	47	10	11	68	
		% of total	69.1	14.7	16.2	100	

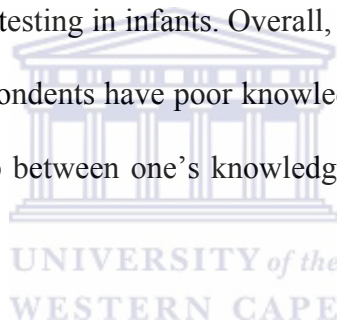
The association between practical skills and department of work was tested for to see if department of work has an effect on one's skill. It was noted that the likelihood ratio was 0.040, which is less than 0.05. This shows that there is a significant association between the department of works in and the skills; therefore we can accept the null hypothesis that department of work has an effect on the level of skills that one has on EID.

#### **4.8 Conclusion**

This chapter presented the findings of the study related to the purpose of the study. The results of the self-administered questionnaire were analyzed using various statistical techniques, such as frequencies and correlations among variables, and were presented in tables and figures. The majority of the respondents had diplomas and most were nurses. Almost all of the respondents knew the meaning of HIV-exposed and HIV-infected infant.

The majority knew that all HIV-exposed infants need to receive cotrimoxazole, and was able to correctly state when these infants are to get cotrimoxazole. More than one-third of the respondents were not familiar with diagnostic tests to be offered to infants.

The findings of the study reveal that respondents were aware of the common modes of HIV transmission from mother to child. The majority of the respondents' performance on EID was average. More than one-third of the respondents were familiar with PCR test sample collection and the site of collecting the blood sample. Most of the participants had problems with interpreting virology and antibody testing in infants. Overall, the total knowledge and skills score indicated that over half of the respondents have poor knowledge and skills on EID. Associations showed that there is a relationship between one's knowledge and qualification and one's skills and department of work.

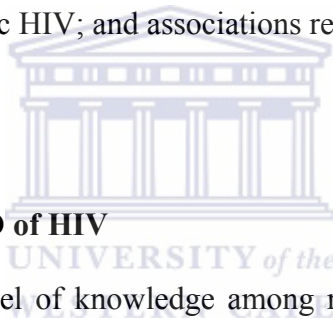


The findings are discussed in the next chapter.

## **CHAPTER FIVE: DISCUSSION**

### **5.1 Introduction**

As the world is aiming for zero deaths from HIV infection and an HIV-free generation, the knowledge of HCPs is crucial to achieving this goal. This study aimed at investigating the knowledge and skills of HCPs on EID of HIV, in order to assess if HCPs have adequate knowledge and skills to perform EID. In this chapter the findings are discussed and interpreted by contrasting them to the results found in similar studies. Discussion of the results is presented under the following headings: knowledge of HCPs on EID of HIV; skills of HCPs on EID of HIV; training of HCPs on paediatric HIV; and associations related to knowledge and skills.



### **5.2 Knowledge of HCPs on EID of HIV**

This study has shown that the level of knowledge among respondents was fair. At least two-thirds of the respondents had good to fair knowledge on EID, while one-third had poor knowledge. The findings of the study correlate with a study in Uganda which found that a quarter of health care workers had inadequate knowledge about paediatric HIV care and counselling skills (Rujumba, Mbasaalaki-Mwaka & Ndeezi, 2010). The results were also similar to a study in rural Kenya (Hassan et al., 2012), which found that HCP had limited knowledge on EID. The knowledge gap of HCPs has a great impact on the outcomes in health (Pakenham-Walsh & Bukachi, 2009), as it can lead HCP to refrain from providing care to the infants, can lead to poor identification due to lack of knowledge on diagnosis as well as poor follow-up of infants born to HIV-infected women. It can also lead to women receiving inconsistent, inaccurate or inadequate information on the process and management of infants on EID.

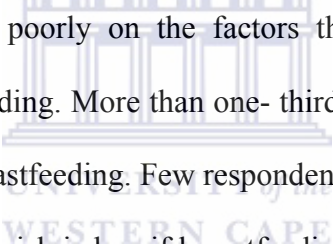
This is supported by a study conducted in Hanoi (Nguyen, Oosterhoff, Pham, Hardon, & Wright, 2009), which found that HIV service delivery was affected by lack of knowledge and skills updating as HCP had poor knowledge and skills in HIV. Adequate information is necessary for people to be aware of treatment possibilities; however, the quality of the information depends on the knowledge of the HCPs (Pakenham-Walsh & Bukachi, 2009).

Pertaining to the meaning of HIV-exposed and HIV-infected infants, the results show that overall HCPs were familiar with the meaning. The findings are contrary to a study conducted in Tamatave, Madagascar (Hentgen, Jaureguiberry, Ramiliaisoa, Andrianantoandro, & Belec, 2002), where findings revealed that knowledge of HCP on HIV infection was poor as nearly three-quarters of HCP believed that a child born to an HIV infected mother would automatically be infected. Thus they did not know the meaning of HIV infected child. The ability of HCP to educate, counsel and even communicate well with patients has a bearing on their knowledge. Knowledge of the HIV exposed and HIV infected infants would help to properly diagnose the infants and then provide proper care hence reduce infant's mortality and morbidity whilst lack of knowledge of HIV exposed and HIV infected infants would lead to misdiagnosis on EID leading to increased mortality and morbidity.

Concerning HCP knowledge on administration of cotrimoxazole prophylaxis, the findings show that HCP were aware of the administration of cotrimoxazole prophylaxis. The findings are contrary to an observational cohort study in China where some HCW were still unaware of the substantial benefits of cotrimoxazole prophylaxis in eligible HIV infected patients (Cheng et al., 2014).



Numerous studies (Madec et al., 2007; Lim et al., 2012; Miro et al., 2009) have stated that cotrimoxazole offers a continuous protective result after ART initiation. A study conducted in Dar es Salaam, Tanzania on the challenges facing cotrimoxazole prophylaxis implementation in HIV exposed infants found that most children who were initiated on cotrimoxazole prophylaxis never experienced opportunistic infections (Kamuhabwa & Manyanga, 2015). Knowledge of HCP on cotrimoxazole prophylaxis is crucial on EID of HIV since diagnosis and management of the infants is done by hence their knowledge on cotrimoxazole prophylaxis is a necessity. Knowledge of the HCP and effective utilization of the knowledge can lead to decreased mortality and morbidity in infants.



Respondents however, performed poorly on the factors that increase the risk of a woman transmitting HIV through breastfeeding. More than one-third had limited knowledge on the risk factors for HIV transmission in breastfeeding. Few respondents indicated exclusive breastfeeding as a risk factor, while in reality the risk is less if breastfeeding is exclusive. This is similar to a study in Papua, New Guinea where HCW had lack of up to date information and knowledge relating to infant HIV feeding (Valley et al., 2013). According to Valley et al. (2013), lack of knowledge and up to date information leads to inadequate information being relayed to women especially in regard to the importance of exclusive breastfeeding for six months. Lawrence & Lawrence (2010), concur that HCPs greatly impact a mother's decision to breastfeed. The impact is negative when incorrect information and support is provided by the HCP to the mother, who is already going through difficult times due to the status of the baby as well as cultural and traditional factors.

Studies have shown that poor counselling and lack of subsequent support for the infant feeding decision almost inevitably leads to mixed feeding, which may increase the risk of MTCT (Koniz-Booher et al., 2004; Shapiro et al., 2003). Lack of knowledge on factors that increase the risk of a woman transmitting HIV through breastfeeding can lead to increased MTCT rate which will may lead to increased demands such as material and human resources on EID.

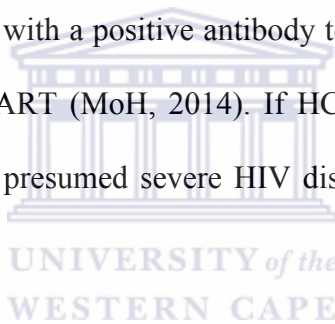
Pertaining to knowledge of HCP on infant diagnostic tests, more than a quarter of the respondents lacked knowledge. Even those who were found to have had good to fair knowledge, there is no ground to say they are competent on EID. HCPs were not familiar with the number of tests offered to infants, when these tests are offered, as well as interpreting the antibody test in infants less than 18 months of age. The findings are similar to a study in rural Kenya which assessed reasons for drop-out from EID services (Hassan et al., 2012). The results from the rural Kenyan study indicated that most mothers are unsure of the number, exact time points, or type of tests to be done for EID services. According to Woldesenbet et al. (2012), lack of awareness about EID services could be one of the reasons why mothers do not self report for testing. The findings in this study agree with the studies above (Hassan et al., 2012 ; Woldesenbet et al., 2012), in that lack of knowledge among HCP on the diagnostic tests could prevent HCP from giving mothers the right information leading to the mothers being unsure or unaware of the process. Diagnosing exposed infants is the crucial step in infant HIV care. This is the point where infants may be missed, and the impact of missing the diagnosis may be deadly. For instance if infected infants are not diagnosed they will not receive ART, which has a negative impact in the reduction of infant mortality (Violari et al., 2008).

HCPs need to be aware that infant diagnostic tests are indeed crucial in infant HIV diagnosis in order to prevent infant mortality.

### **5.3 Skills of HCPs on EID**

In terms of overall skills score, in this study two-thirds of the respondents scored <69% which represents poor skills. Inadequate skills among HCPs is a barrier to EID of HIV as HCPs may be unable to provide quality care in identification of the exposed infants, counselling the mothers and identification of infected infants. Other studies for instance a study conducted in Uganda on the challenges faced by HCW in providing counselling services to HIV positive children (Rujumba et al., 2010) and situational analysis in South Africa (Woldesenbet et al., 2012) have shown lack of skills of HCPs in management of paediatric HIV which are the major challenges in the delivery of paediatric HIV care (Rujumba et al., 2010; Woldesenbet et al., 2012). Skills on EID of HIV are the pillar to effective EID management. As indicated earlier the current study has shown that three-quarters of the respondents lacked skills on EID of HIV. A significant number of participants thought they were not fully capable to perform EID of HIV. Poor performance of service providers leads to inappropriate care, which contributes to poor health outcomes. Several articles (Dielemen & Harnmeijer, 2006; Garcia-Prado & Chawla, 2006; Rowe, de Savigny, Lanata & Victoria, 2005) have reported problems in service provision that arise due to poor performance of health workers. Skills deficit, unclear expectations and lack of motivation lead to performance problems (Hughes et al., 2002, as cited by Dielemen & Harnmeijer, 2006). Possible reasons for poor performance could be inappropriate or inadequate training, weak health systems as well as difficult working conditions (Dielemen & Harnmeijer, 2006).

This study has shown that less than a quarter of the respondents were not able to identify infants with presumed AIDS as well as when the presumed AIDS diagnosis is to be made which can lead to HCP being reluctant or unable to diagnose such infants. Grundman et al., (2011), stated that in history HCP have been reluctant to treat children with presumptive diagnosis due to numerous concerns such as stigma for infants with unclear HIV status or physicians comfort with moderately predictive diagnostic tools. Presumed diagnosis is an important aspect, especially in resource-limited countries where the total availability of diagnostic tests is a challenge. According to the MoH (2014) an infant aged under 12 months with only a positive HIV rapid test cannot be given a WHO clinical stage, because HIV antibodies in infants do not confirm HIV infection. However, an infant with a positive antibody test plus specific conditions is likely to have AIDS and needs to start ART (MoH, 2014). If HCPs lack the skills to identify these infants, incorrect interpretation of presumed severe HIV disease (PSHD) symptoms will arise, leading to an increase in mortality.



Pertaining to antibody and virological tests, two-thirds of the respondents were not able to state the use of the antibody test and one-third were not able to state the use of virological tests. Saving children's lives depends on early identification of those who are HIV infected. If the HCPs are not sure of which tests are for what, then there is a risk of inappropriate diagnosis. The definitive diagnosis of HIV infection in children at any age requires skills on diagnostic testing that confirms the presence of HIV.

According to WHO guidelines (Dieleman & Harnmeijer, 2006), virological tests diagnose infection in infants and children aged under 18 months, whilst antibody tests are used to identify HIV exposure of infants to diagnose HIV infection in children aged 18 months or more, and also identify HIV antibody-positive children aged under 18 months and support a presumptive clinical diagnosis of severe HIV disease to allow initiation of ART.

#### **5.4 Training of HCPs**

Health care providers' knowledge and skills which are needed for effective performance continue to grow and change rapidly. The HCPs' knowledge and skills depend on the quality of training received. Training refers to planned efforts to facilitate the learning of specific competencies (Noe, 2005, as cited in Robson et al., 2010). It was pointed out that specialised knowledge, skills and behaviours needed for success in a particular environment make up these competencies (Robson et al., 2010).

The current study demonstrated that at least one-third of HCPs had not attended training in paediatric HIV and two-thirds had not attended training in HIV testing. This is similar to the findings of a study conducted in Uganda on challenges faced by health workers in providing counselling services to HIV-positive, which also found a greater number of health workers not trained in HIV counselling and paediatric HIV care (Rujumba et al., 2010). Training health care providers is vital as it provides guidance to HCPs on how to utilise every opportunity within maternal and child health entry points in the hospitals in order to identify exposed and infected infants early and link them to appropriate care so as to improve survival. Hence training HCPs on EID would increase the scale up of EID thereby reducing mortality and morbidity.

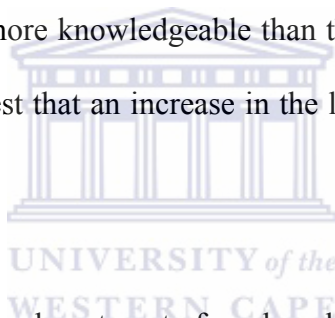
According to the WHO (2010c), some of the strategies that are needed to improve the gap in paediatric HIV and EID services include capacity building in all clinical and public health care settings.

As for the adequacy of the content covered, the study indicate that less than half of the respondents felt that the content that was covered during training was adequate. This is contrary to a study in South Africa on evaluation of HIV lay counselling and testing profession, where more than four-fifth of counsellors reported receiving adequate training in HIV (Mwisongo et al., 2015). According to Thoresen and Fielding (2011), insufficient training may lead to staff dissatisfaction, which may affect delivery of health services. This is supported by Dielemen and Harnmeijer (2006), who state that lack of competencies occurs as a result of inadequate training and limited access to training. Hence there is a need for problem analysis and training needs assessment, as well as a need to increase the efforts to train all of the HCPs in order to minimise the chances of poor identification as well as poor management of infants which may arise as a result of lack of knowledge and skills on EID.

## **5.5 Associations related to knowledge and skills**

As shown in the results, there was a relationship between one's level of education and knowledge on EID. Knowledge is a significant component of understanding and feeling in control of behaviour. Good knowledge was found to be significantly associated with the demographic characteristic of highest qualification obtained.

According to Leganger and Kraft (2003) and Mirousky and Ross (1998), as cited in Egerter et al. (2009), higher levels of education are linked with greater perception of personal control, fostering skills, habits and attitudes such as problem solving, purposefulness, self-directedness, perseverance and confidence, that contribute to people's expectations that their own actions and behaviours shape what happens to them. The association that was found was significant and in line with the expectations as well as findings in a study conducted in Iraq on knowledge, attitudes and practices among HCW and tuberculosis patients where there was a significant association between knowledge and higher qualification ( $P=0.02$ ) (Hashim, Al Kubaisy & Al Dulayne, 2003). The findings were also similar to a study in Addis Ababa on tuberculosis where health workers with degree were more knowledgeable than those with diplomas (Gizaw, Alemu & Kibret, 2015). The results suggest that an increase in the level of education among HCPs can greatly benefit EID.

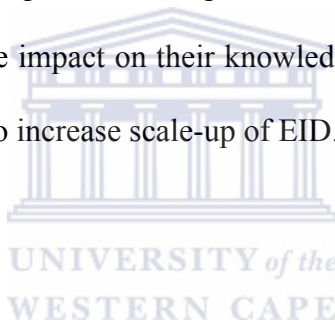


Concerning the relationship between department of work and skills of HCPs on EID, the findings show that there was a relationship between department of work and skills; thus department of work has an effect on one's skills. This was expected, as departments such as the paediatric department and under-five clinic deal more with the practical aspect of EID than the maternity department; hence HCPs in paediatric wards and under-five clinics need to be more knowledgeable and skilled than those in the maternity department. However, being information givers to mothers, it is necessary for the HCPs to be aware of what is being practically done. According to Che, Kuo & Che (2011), job rotation is a necessary tool to develop skills, knowledge and motivation as well as job performance and productivity.

In this case job rotation can help HCPs from all departments working on EID to be skilled, since they will be exposed to the departments which are working with the infants more (especially those working in maternity).

## **5.6 Summary**

The results of the study indicated that HCPs have insufficient knowledge of and skills in certain aspects of EID of HIV. This can impact negatively on EID of HIV as HCPs are the persons who give information as well as identify infants who are exposed and infected. Insufficient training is one of the factors that contributes to poor knowledge and skills. Level of education of HCPs and department of work have a positive impact on their knowledge and skills. Increasing the quality and quantity of training may help to increase scale-up of EID.



## **5.7 Study limitations**

Due to time and financial constraints the researcher was unable to include more study participants from other health facilities to ensure representativeness of the study. This will limit the generalisability of the results of the study to other population. The self-administered questionnaire that was given to the respondents depended on the ability of the respondent to recall information. The respondents might not have been able to recall all the information on EID of HIV during the time of the study. Using a mixed research method would have given a more clear and in-depth picture of the problems. However, despite these limitations this survey allowed identification of interesting facts on the knowledge and skills of HCPs on EID of HIV.



## **CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS**

### **6.1 Introduction**

The final chapter of the dissertation presents the conclusion, recommendations and implications of the study.

### **6.2 Conclusion**

The aim of the study was to investigate the knowledge and skills of HCP on EID of HIV in Mzuzu, Malawi. An extensive literature review was conducted to identify relevant evidence about the knowledge of HCP on EID of HIV. The study investigated the knowledge and skills of HCP on EID of HIV. The findings of the study collaborated with several studies on related issues. The findings have answered the research question. The results of this study indicated that more than one-third of the respondents had a lack of knowledge and skills in EID of HIV which is a main component needed for effective EID. This was the first study of its kind to be conducted in Malawi as far as the researcher is aware.

Objective one of the study was to investigate the knowledge of HCP on early infant diagnosis of HIV. The study conclude that HCPs had limited knowledge on EID of HIV. These findings reflect the need to address the practical challenges of EID service delivery. It is important that government, civil society organisations and donors in PMTCT and EID address the challenge of lack of knowledge and skills of HCPs on EID practice.

Objective two of the study was to investigate the skills of HCP's on EID of HIV. The study conclude that HCPs had limited skills on EID.

Development of skills is more easily achieved when one has prior knowledge of the task to be accomplished, however practice is the only way to develop skills, hence training of HCP should emphasise more on the practical aspect to ensure development of the skills.

## **6.4 Recommendations**

The study has generated a number of recommendations that would be of interest to policy makers, trainers, practitioners and educators.

### **6.4.1 Recommendations for services**

- The discussion has shown that improving training which is problem-based may help increase the scale-up of EID. It is a concern that HCPs have insufficient knowledge and skills on EID performance, as these are the people who identify the infected infants and disseminate information regarding HIV management. Hence all HCPs need to be trained adequately in order for them to be knowledgeable on EID and HIV so as to attain the goal. These results can help the MoH to particularise their strategy to improve the quality of care, hence scaling-up EID of HIV.

### **6.4.2 Recommendations for training**

- HCPs are in key positions to detect and refer infants who are exposed to and infected with HIV as well as to educate their mothers on the necessary care to be provided. As health educators, HCPs can talk to mothers, family members and communities about ways to prevent and manage infant HIV.

Training providers need to assess the needs of HCPs with regard to infant HIV first, then provide the necessary training based on the perceived needs. This is important because information provided in response to expressed needs is more likely to be practiced than forced information. There is a need to increase the amount of training for HCPs in Malawi as well as to follow up training in order to update HCPs with new evidence-based practices and guidelines for EID of HIV.

- All personnel providing HIV testing and counselling to children need to receive appropriate training in the skills and techniques for paediatric HIV diagnosis and care. Facility-based training and refresher courses should be offered in the hospitals, especially with regard to practical skills needed for effective EID. Production of posters and pamphlets should also be considered for effective EID.



#### **6.4.3 Recommendation for further research**

- The small sample size of the study limited the generalisability to other populations; it was also limited to specific areas. Therefore, it is recommended that a larger research study with a larger sample size covering a wider study area and using a mixed research method be conducted for a comprehensive understanding of and to provide an in-depth picture of the problems of EID in Malawi.
- The study was conducted in one city in Malawi, and hence the findings may not be generalised because of the small sample size.

It is recommended that further research with a larger sample size covering more research settings from different health facilities should be carried out in order to assess the level of knowledge of HCPs, combined with an in-depth study to elicit more in-depth information.



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## **APPENDIX I: INFORMATION SHEET**

### **UNIVERSITY OF THE WESTERN CAPE**

Private Bag X 17, Bellville 7535, South Africa

**Tel:** +27 21 959 9346 **Fax:** +27 21 959 2271

**E-mail:** 3410283@myuwc.ac.za

### **INFORMATION SHEET**

#### **Title of the Research**

An investigation of the knowledge and skills of health care providers on early infant diagnosis of HIV in Mzuzu, Malawi.

#### **What is this study about?**

This is a research project being conducted by Veronica Mkuyamba at the University of the Western Cape in partial fulfilment of the requirements of the Master Degree in Nursing who is being supervised by Dr Million Bimerew. We are inviting you to participate in this research project because you are a health care provider working with infants in your department. The purpose of this research project is to investigate the knowledge and skills of health care providers on early infant diagnosis of HIV in Mzuzu, Malawi in order to gain an understanding of how much health care providers know about early infant diagnosis of HIV so as to formulate strategies to improve the scale up of early infant diagnosis.

#### **What will I be asked to do if I agree to participate?**

You will be asked to answer questions related to knowledge and skills about early infant diagnosis of HIV. You will be given a questionnaire which has a total of 30 questions. It can take 10-20 minutes to answer the questionnaire.

You will be given the questionnaire by the researcher and you will answer the questionnaire at your own time and hand it back to the researcher in a sealed given envelop at an agreed date. You will also be required to sign a consent form to show that you have agreed to participate in the study.

**Would my participation in this study be kept confidential?**

The researchers undertake to protect your identity and the nature of your contribution. It is guaranteed that, the information that you will give during data collection will never be used against you in any way. No identification details will be used on the questionnaires however code numbers will be assigned to the questionnaires so that your identity cannot be linked to the responses. All the questionnaires will be kept in a secure place (filing cabinet) under lock and key for five years after the results have been published to ensure confidentiality and password protected computers will be used. This form will **NOT** be used as part of data. The forms will immediately be destroyed after the completion of the research. If we write a report or article about this research project, your identity will be protected.

**Voluntary Participation and Withdrawal**

Your participation in this research is entirely voluntary. If you choose to participate, you may stop at any time. You may also choose not to answer particular questions that are asked during this enquiry.

**Informed Consent**

You will be required to sign the consent form to show that you have understood and agree to participate in the study before answering the questionnaire. The consent form is attached to this Information Sheet so that you will be able to review the consent form and then decide whether you would like to participate in this study or not.

### **What are the risks of this research?**

All human interactions and talking about self or others carry some amount of risks. Such risks will be minimised through prompt action to assist you if you experience any discomfort, psychological or otherwise during the process of your participation in this study will be done. Where necessary, an appropriate referral to a suitable professional for further assistance or intervention will be made.

### **What are the benefits of this research?**

This research is not designed to help you personally, but the results may help the investigator learn more about health care providers understanding of early infant diagnosis of HIV. We hope that, in the future, other people might benefit from this study through improved understanding of early infant diagnosis of HIV which will help to improve its scale up.

### **What if I have questions?**

This research is being conducted by **Veronica Mkuyamba**, Department of Nursing at the University of the Western Cape. If you have any questions about the research study itself, please contact Veronica Mkuyamba, **Cell: 0998567549**, **email: 3410283@myuwc.ac.za**. Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Prof. Karien Jooste

Head of Department

University of the Western Cape

Private Bag X17

Bellville 7535

kjooste@uwc.ac.za

Prof. José Frantz

Dean of the Faculty of Community and Health Sciences

University of the Western Cape

Private Bag X17

Bellville 7535

[chs-deansoffice@uwc.ac.za](mailto:chs-deansoffice@uwc.ac.za)



**APPENDIX II: CONSENT FORM**

**UNIVERSITY OF THE WESTERN CAPE**

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21 959 9346 Fax: +27 21 959 2271

**E-mail:** 3410283@myuwc.ac.za

**CONSENT FORM**

**Title of the Research Project**

An investigation on the knowledge and skills of health care providers on early infant diagnosis of HIV in Mzuzu, Malawi.



The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

**Participant's name.....**

**Participant's signature.....**

**Date.....**

## APPENDIX III: QUESTIONNAIRE

### Questionnaire of the knowledge and skills of health care providers on early infant diagnosis of HIV in Mzuzu, Malawi.

#### Instructions

1. Please answer the following questions. Should you need clarity on the questions, please feel free to ask the researcher.
2. Please do not share the answers.
3. Please circle the answer.


Questionnaire Number:.....

SECTION A: DEMOGRAPHIC DATA		
Question	Question	Answer
1	What is your current age?	1) 20-30 2) 31-40 3) 41-50 4) 51 and above
2	What is your sex?	1) Male 2) Female
3	What is your qualification?	1) Degree 2) Diploma 3) Other specify .....
4	What is your position?	1) Doctor 2) Nursing officer 3) Clinical officer 4) Medical assistant 5) Nurse midwife technician 6) Other specify.....

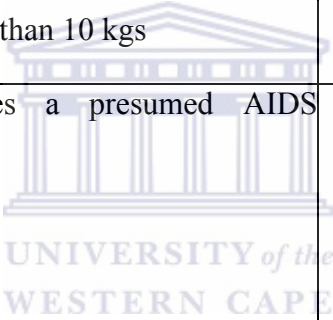


		.....
5	Which department do you work in?	1) Paediatric ward 2) Maternity 3) Under-five clinic 4) Other (Specify).....
6	How long have you worked at the department?	.....
<b>SECTION B: KNOWLEDGE</b>		
7	What does HIV exposed infant mean?	1) ALL children who are born to HIV-infected mothers without confirmed infection. 2) All HIV exposed children are infected. 3) None of the above
8	What does HIV infected infant mean?	1) ALL children who are born to HIV-infected mothers are HIV exposed. 2) All HIV exposed children are infected. 3) A child who is infected with HIV has the HIV virus in his or her body.

9	Which infants receive cotrimoxazole prophylaxis?	1) Only infected infants 2) All HIV exposed infants 3) None of the above
10	How many tests are offered for an exposed child?	1) 4 2) 2 3) 3
11	At what age is the infant first test offered?	1) 1 week 2) 14 weeks 3) 6 weeks
12	At what age is the next test offered after the first test?	1) 6 Months 2) 12 months 3) 24 months
13	When does the HIV exposed child receive cotrimoxazole?	1) At 6 weeks 2) At 1 week 3) At birth
14	A positive antibody test at less than 18 months means:	1) child is infected 2) child not infected 3) Need for confirmation test
15	Have you attended any training in regards to infant HIV?	1) Yes 2) No
16	If yes, was the content covered adequate?	1) Yes 2) No 3) Not sure

15	<p>In your opinion, how can a newborn child be infected with HIV?</p> <p>(TICK ALL THAT APPLY)</p> 	<p>1) From mother during pregnancy [ ]</p> <p>2) Through breastfeeding [ ]</p> <p>3) During delivery [ ]</p> <p>4) From being injected with contaminated needles [ ]</p> <p>5) Other specify .....</p>
16	<p>What are the factors that increase the risk of a woman transmitting HIV through breastfeeding?</p> <p>(TICK ALL THAT APPLY)</p>	<p>1) Recent infection of HIV [ ]</p> <p>3) Obstetric procedures [ ]</p> <p>4) Duration of breastfeeding [ ]</p> <p>5) Exclusive breastfeeding [ ]</p> <p>6) Mixed feeding [ ]</p> <p>8) Other (Specify) .....</p>

17	Have you attended any training in regards to infant HIV?	2) Yes 2) No
18	If yes, was the content covered adequate?	2) Yes 2) No 3) not sure 4) Not applicable
19	Have you been trained in HIV testing?	1) Yes 2) No
20	Are you satisfied with the knowledge you have regarding Early infant diagnosis of HIV?	1) Yes 2) No 3) Not sure
<b>SECTION C: SKILLS</b>		
21	On a scale of 0-3, rate your performance on EID of HIV. where 1- poor, 2- fair, 3- average (4- good, 5- excellent)	1 2 3 4 5
22	Do you provide PCR testing for infants that come with a caregiver (e.g. grandmothers, etc.) without the mother	1) Yes 2) No 3) Don't know

	present?	
23	I draw blood on the ..... for 1-4 months babies less than 6kgs body weight	1) Heel 2) Toe 3) Finger
24	I draw blood on the ..... draw blood for 5-10 months old babies less than 10 kgs	1) Heel 2) Toe 3) Finger
25	I draw blood on the ..... for babies larger than 10 kgs	1) Heel 2) Toe 3) Finger
25	What does a presumed AIDS mean?	 <p>1). Assuming in certain circumstances without definitive diagnosis</p> <p>2). HIV testing that a child is HIV infected</p> <p>3). Making a diagnosis using clinical signs for presumed severe HIV disease</p>
26	When should a presumed diagnosis be made? TICK ALL THAT APPLY	1). when the child is less than 12 months of age and rapid test positive with severe sepsis, severe pneumonia

		<p>2). Test kits not available</p> <p>3). Clinical urgency requires the clinician to consider ART initiation for the child.</p>
28	In your opinion, positive antibody test may indicate that the child is?	<p>1). HIV infected</p> <p>2). HIV exposed</p> <p>3). May or may not be HIV infected</p>
29	In infants, HIV antibody tests are important for?	<p>1). screening for exposure to HIV</p> <p>2). for diagnosing HIV infection</p> <p>3). None of the above</p>
30	In infants virological tests are important for?	<p>Diagnosing HIV infections</p> <p>screening for exposure</p> <p>None</p>

## APPENDIX IV: ETHICS APPROVAL FROM UNIVERSITY OF THE WESTERN CAPE



UNIVERSITY of the  
WESTERN CAPE

### OFFICE OF THE DEAN DEPARTMENT OF RESEARCH DEVELOPMENT

08 September 2015

#### To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:  
Ms V Mkuyamba (School of Nursing)

Research Project: An investigation of the knowledge and skills of health care providers on early infant diagnosis of HIV in Mzuzu, Malawi.

Registration no: 15/6/18

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

*Ms Patricia Josias  
Research Ethics Committee Officer  
University of the Western Cape*

Private Bag X17, Bellville 7535, South Africa  
T: +27 21 959 2988/2948 . F: +27 21 959 3170  
E: pjosias@uwc.ac.za  
www.uwc.ac.za

A place of quality,  
a place to grow, from hope  
to action through knowledge

**APPENDIX V: PERMISSION TO CARRY OUT THE STUDY FROM MZUZU  
CENTRAL HOSPITAL**

Tel.: (265) 1 320 916/911/998/976/986  
Fax: (265) 1 320 270/217  
E-mail: [directormch@malawi.net](mailto:directormch@malawi.net)



*Address all your correspondence to:*

THE DIRECTOR  
MZUZU CENTRAL HOSPITAL  
PRIVATE BAG 209  
LUWINGA  
MZUZU 2

27/7/2015

Dear Ms Mkuyamba,

**PERMISSION TO COLLECT DATA FOR A STUDY AT MZUZU  
CENTRAL HOSPITAL**

I write to inform you that permission has been granted for you to collect data at Mzuzu Central Hospital for your study titled "*Investigation of knowledge and skills of health care providers on early infant diagnosis*".

The proposed study is of relevance to the hospital therefore we expect you to furnish us with research findings upon completion of the study, a copy of which will be kept in our Library database for research conducted at Mzuzu Central Hospital.

A handwritten signature in black ink, appearing to read 'Rose K. Nyirenda'.

**Rose K. Nyirenda (Msc.CoM Health., SRNM)**

**Hospital Director**



**APPENDIX VI: PERMISSION TO CARRY OUT THE STUDY FROM EKWENDENI  
MISSION HOSPITAL**



**CHURCH OF CENTRAL AFRICA PRESBYTERIAN  
SYNOD OF LIVINGSTONIA**

**EKWENDENI HOSPITAL  
P.O. Box 19  
Ekwendeni  
MALAWI**

**Telephone: (265) 01 339 222/246/281  
Fax: (265) 01 339 059**

**Email: [ekwehospital@gmail.com](mailto:ekwehospital@gmail.com)**

9<sup>th</sup> September, 2015

To: — Veronica Mkuyamba,  
School of Nursing,  
University of the Western Cape,  
Private Bag 17, Bellville,  
**SOUTH AFRICA.**

Dear Veronica,

RE: **APPLICATION FOR PERMISSION TO CONDUCT RESEARCH AT EKWENDENI  
MISSION HOSPITAL**

Greetings in the name of our Lord Jesus Christ from Ekwendeni Hospital.

Reference is made to your application to conduct research at Ekwendeni Hospital received on 4<sup>th</sup> September, 2015. I write on behalf of the Chief Medical Officer in – Charge and Management to allow you conduct you research at this Hospital with the belief that you will keep your promise of sharing the findings with the Hospital Management.

When you're ready to start your exercise please come and meet the Principal Clinical Superintendent, who is the Clinical Department in-charge, Mr Albert Nyirongo who will introduce you to the other officers that will assist you in your research.

Wishing you all the best in your research.

Yours in His service,

Jeffrey M. Mwala  
Principal Hospital Administrator  
For Chief Medical Officer In-Charge  
**EKWENDENI MISSION HOSPITAL**

**APPENDIX VII: ETHICS APPROVAL FROM MALAWI NATIONAL HEALTH  
SCIENCE RESEARCH COUNCIL**

Telephone: + 265 789 400  
Facsimile: + 265 789 431  
e-mail mohdoccentre@gmail.com  
**All Communications should be addressed to:  
The Secretary for Health**



*In reply please quote No. MED/4/36c*

MINISTRY OF HEALTH  
P.O. BOX 30377  
LILONGWE 3  
MALAWI

28th September 2015

Veronica Mkuyamba  
University of the Western Cape

Dear Sir/Madam,

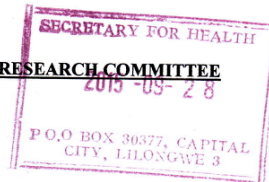
**Re: Protocol # 15/9/1490: An investigation of the knowledge and skills of health care providers on early infant diagnosis of HIV in Mzuzu, Malawi**

Thank you for the above titled proposal that you submitted to the National Health Sciences Research Committee (NHSRC) for review. Please be advised that the NHSRC has **reviewed and approved** your application to conduct the above titled study.

- **APPROVAL NUMBER** : NHSRC # 15/9/1490  
The above details should be used on all correspondence, consent forms and documents as appropriate.
- **APPROVAL DATE** : 28/9/2015
- **EXPIRATION DATE** : This approval expires on 28/09/2016  
After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the NHSRC secretariat should be submitted one month before the expiration date for continuing review.
- **SERIOUS ADVERSE EVENT REPORTING** : All serious problems having to do with subject safety must be reported to the National Health Sciences Research Committee within 10 working days using standard forms obtainable from the NHSRC Secretariat.
- **MODIFICATIONS**: Prior NHSRC approval using standard forms obtainable from the NHSRC Secretariat is required before implementing any changes in the Protocol (including changes in the consent documents). You may not use any other consent documents besides those approved by the NHSRC.
- **TERMINATION OF STUDY**: On termination of a study, a report has to be submitted to the NHSRC using standard forms obtainable from the NHSRC Secretariat.
- **QUESTIONS**: Please contact the NHSRC on Telephone No. (01) 789314, 0888344443 or by e-mail on mohdoccentre@gmail.com
- **Other**:  
Please be reminded to send in copies of your final research results for our records as well as for the Health Research Database.

Kind regards from the NHSRC Secretariat.

  
.....  
**FOR CHAIRMAN, NATIONAL HEALTH SCIENCES RESEARCH COMMITTEE**



**PROMOTING THE ETHICAL CONDUCT OF RESEARCH**  
Executive Committee: *Dr. B. Chilima (Chairman), Prof. E. Molyneux (Vice Chairperson)*  
Registered with the USA Office for Human Research Protections (OHRP) as an International IRB  
(IRB Number IRR06063905 FWA00005976)

**APPENDIX VIII: PERMISSION TO CARRY OUT THE STUDY FROM MZUZU  
HEALTH CENTRE**

Telephone: + 265 01 311 576  
+ 265 01 311 576  
Email: dhonzimbanorth@yahoo.co.uk  
All Communications should be addressed to:  
DISTRICT HEALTH OFFICER



In reply please quote no. REF ADMN/2  
MINISTRY OF HEALTH  
The District Health Officer  
Mzimba North District Health Office  
P.O Box 299  
Mzuzu

**4<sup>th</sup> September, 2015**

**Ref.No. MZ/N/ADM/1/1**

Veronica Mkuyamba,  
University of Western Cape ,  
School of Nursing,  
Private Bag 17,  
Bellville,  
South Africa.



Dear Madam,

**CLEARANCE REQUEST TO CONDUCT A RESEARCH AT MZUZU HEALTH CENTRE**

With reference to your letter dated 1<sup>st</sup> August, 2015 the office grants you authorization to carry out your thesis research study titled "An investigation of knowledge and Skills of Health care providers on Early Infant diagnosis of HIV in Mzuzu City, Malawi", upon approval from an Institutional Review Board (IRB).

Yours Sincerely,

A handwritten signature in blue ink, appearing to be 'KS'.

Dr. Khumbo Shumba  
**DISTRICT HEALTH OFFICER**

